

THE FACE *in*
HEALTH AND DISEASE

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This book is dedicated to the memory of my grandfather, Dr. M. Kinstler (who practiced medicine in Boston, Massachusetts, in 1867), and of my father and mother, who devoted their lives to the practice of medicine.

PREFACE

IT IS MY PURPOSE in this volume to present in words and pictures many varieties of faces, from the glowing and vital countenance of robust health to saddening deformities.

The book is meant both for the specialist and for the general practitioner, and has been prepared in the hope that it may stimulate study of the face as a diagnostic guide. Registering as it does the condition of the body and of the mind the face is not only an accessible but a sensitive barometer of health. From serious disease to minute and fleeting abnormalities, unhealthy somatic conditions have signs and portents written on the faces of patients for the understanding physician to read. While *"snapshot" diagnoses are dangerous and should never be made*, many types of pathologic faces are so characteristic of disease entities as to be practically diagnostic.

This is true in glandular disorders, such as acromegaly, exophthalmic goiter, and myxedema, in constitutional or congenital conditions such as cretinism, mongolism, and microcephalic idiocy, and in many other deviations from the normal. Little experience is needed to recognize the overhanging forehead, depressed nasal bridge, and notched teeth of congenital syphilis, or the facial eruption which appears in the secondary stage of the acquired disease.

Jaundice, too, carries its message. The bronze pigmentation of Addison's disease, the cyanosis of circulatory disorders, the pale yellowish complexion of anemia, the unearthly hue of argyria—all speak a language not difficult to interpret.

The expression of pain, the cold sweat, the anxiety deeply etched on the features in attacks of colic from gallstones or kidney stones, the ashen stillness in angina pectoris, and the flaming excitement and restlessness in coronary occlusion plainly indicate their source.

Mental diseases notably stamp their mark upon the countenance. Consider the contrasting faces in the two chief functional psychoses. Typically (though not universally) asthenic, the person with schizophrenia usually has the long head and narrow face which go with an asthenic physique. His set, expressionless features, his uncomprehending eyes staring into space, and his obvious lack of contact with external reality once seen may always be recognized. In contrast, the manic depressive patient as a rule is of pyknic build, with round head and short, broad face, and often with heavy jowls. His overactivity, hyper

animation, distractibility, and incessant speech expressing flight of ideas can scarcely be misinterpreted. In the depressed phase, with slowing of thought, speech, and action, and often an anxious expression, his condition again is obvious and in some cases there are particularly characteristic facial expressions, of which perhaps the most 'intriguing' is the porcine *Schnauzkampf*.

The bewildered arteriosclerotic patient, the euphoric person with dementia paralytica, and the pessimistic deluded victim of involutional melancholia all have their characteristic faces.

Lesions of the central nervous system are reflected by the face, producing squints, speech defects, tremors, paralyses and abnormal expressions of many varieties. One who has seen, for example, the ironed-out facies following encephalitis or the afflictions of a patient suffering from Huntington's chorea with his dementia irregular convulsive movements, and spasmodic attempts to raise the head, cannot fail to recognize the pathognomonic nature of the facial appearance.

Many cutaneous lesions which appear on the face are characteristic, and in some conditions equally characteristic is the absence of facial lesions when they are present elsewhere on the body.

Deficiency diseases as no one can fail to know in these days of epoch-making and well advertised nutritional discoveries, frequently leave their mark on the face or its adnexa. Thus the corners of the mouth are sore and the tongue red and shiny in vitamin B deficiency, while a lack of ascorbic acid produces anemia, spongy gums, and mucocutaneous hemorrhages. Vitamin A deficiency is reported to be the cause of night blindness and keratoses and delayed closure of the fontanelles and sweating of the head may be seen when vitamin D intake or exposure to sunshine is insufficient.

Even in less obvious cases the face provides an index to the condition of the patient. Minute and fleeting changes of expression—slight departures from the normal which ordinarily would pass unnoticed—indicate to the keen medical observer that certain pathologic conditions may be present and point to a path for further investigation. Many of these changes are so indefinite as to defy description or even photography, yet with experience a physician comes to rely greatly on his intuitive interpretation of them.

To appraise the significance of facial departures from the normal, the first requisite is an estimate of the patient's habitual personality—whether he is extrovert or introvert, warm or cold in his emotional responses, egocentric or altruistic, kind or selfish, self-controlled or self-indulgent, neurotic or relatively stable, with or without insight. It is

on the basis of his usual behavior that a useful evaluation can best be made of his response to disease conditions

There is no part of the face or its adnexa which is immune to the effects of pathologic changes. Hence there are many features to be observed: the structure of the face and head in comparison with the structure of the body, the color of the skin, conjunctivae, and mucous membranes, the texture of the skin and hair, abnormalities in quantity and distribution of hair, any definite lesions which may be visible on the face or head, and the condition of the oral mucous membranes, tongue, gums, teeth, tonsils, and rhinopharynx. Testing of the eyes for reaction to light and in accommodation has become routine in physical examinations, and ophthalmoscopic examination of the retinas yields much additional information on the condition of blood vessels and general health. Study of muscular coordination is invaluable to distinguish or eliminate diseases of the central nervous system. Much can be learned also from vasomotor phenomena, and the facial expression and play of emotions are effective indicators of normality or abnormality.

Especially in examination of children is the facial expression of diagnostic value. A baby cannot tell one his symptoms, hence it is doubly important to observe with the greatest care the appearance of his face, to listen for the message his cry conveys, and to note his reaction to the examination. A child does not dissemble, and this makes him a most satisfactory patient. For, rightly interpreted, his reactions can be counted upon to disclose his true condition.

An amazing amount of knowledge can be gleaned through study of the face and the organs closely associated with it. They are fertile sources of information both directly and indirectly, since the findings may suggest further investigations which will confirm the tentative diagnosis made on the basis of impressions received through the five senses.

Our forefathers were particularly skilled in the use of their five senses. They had to be. They had no other means of diagnosing disease. They were not blessed, as are we now, with the x rays, the electrocardiograph, the metabolismeter, the facilities for serologic and pathologic studies, and the hosts of other valuable laboratory tests and precision methods which have been developed by a second science to aid their fortunate descendants in the diagnosis of disease. It is hard to realize that even the microscope has been widely used only within the past fifty years, and that our own fathers (and perhaps, indeed, our elder brothers) listened to hearts and lungs with their unaided ears and estimated the blood pressure with their sensitive fingertips. They were forced to practice empirical medicine, and as a result they learned to

judge, almost intuitively, by signs and obscure indications, what it was that ailed their patients and what results they were achieving by their therapeutic efforts.

It is a pity that we have allowed so much of their skill to become obsolescent, for it is a skill that can be supplemented but cannot be replaced by any laboratory technic

Whether general practitioner or specialist, the physician must be a good diagnostician before he can become a good therapist. As my teacher Nicholas Senn so aptly phrased this idea, "He who wants to be a good surgeon must first of all strive to be a good physician." I believe that he who makes good use of all his senses in conjunction with modern diagnostic methods will serve his patients best.

During decades of practice, it has been my great privilege to treat a multitude of pathologic conditions and to study the afflicted faces which accompanied them constantly endeavoring thereby to improve my own diagnostic ability. In all humility, it is my hope to share these experiences with my colleagues.

For a number of illustrations in this book I am indebted to other authors. Moreover, I have had to seek, and have generously been granted, the aid of various specialists in securing illustrations for certain chapters which I as a general surgeon would not have been qualified to prepare alone. For all of this help I am most grateful and I have endeavored to include a specific acknowledgment under each of the illustrations. If in the stress of preparing the manuscript over a long period, under wartime conditions, I have omitted acknowledgment of any person's contribution it is inadvertent and deeply regretted.

If this study should prove to be a broadening influence to those who are interested in the faces from any point of view, the efforts put forth in assembling and coordinating the material it contains will be amply rewarded.

MAX THOREK

Chicago

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CHAPTER I

HISTORICAL CONSIDERATIONS

THE FACE it is stated is an open book which all can read. Some however read between the lines and find more than is visible to others or maybe even more than exists. Since this part of our anatomy is most conspicuous and constantly before others—our advertisement to the world as it were—it is but logical that since the dawn of time men have appeared who felt that the face could hold no secret which they could not decipher. Thus in every century and in every clime not excluding our own some species of character analysis based on facial characteristics have appeared. Women feel intuitively that they can tell character at a glance. Business executives pride themselves on that ability as does almost every one else. People may willingly admit ignorance on practically everything but when their ability to judge character is in the least questioned they straightway wax indignant.

This universal quirk if so it may be called readily explains the fascination and appeal of physiognomy to some. Physiognomy can hardly be defined or dignified as pseudoscientific but it purports that character may be read from facial lineaments and bodily form—an unfounded premise which it attempts to prove. This is a most regrettable contradiction of customary scientific methods of first collecting facts and then building up laws or generalizations which would adequately explain or interpret those facts.

Since the day when Socrates is reputed to have recognized at first sight the superior mental endowment of Plato his pupil and disciple it is amazing but none the less true that much folderol and sheer rubbish has been and still is being written about character analysis based on facial features. The various systems not only claim to be able to tell one's strong and weak points but even advise one as to the vocation for which he is best fitted. Obviously such a highly complex and variously determined thing as a man's character cannot be ascertained by inspection of the contour of his nose or the shape of his ear. Character is an intangible abstraction it is the aggregate of personality traits and qualities that direct and shape the course of one's life. A careful scrutiny therefore of the tenor of that life as exemplified by past performances and conduct in general is a more satisfactory approach to its study than is the estimation of the number of lines in one's forehead.

Aristotle (384-322 B.C.) who was Plato's pupil was the Father of Physiognomy in addition to his other many and varied accomplishments.

He gave the first systematic treatise on it in which he describes at great length the distinguishing features representative of genius and stupidity strength and weakness timidity and bravery and so on. He compares the varieties of mankind to animals. With regard to the nose he has a dozen classical types. Thick bulbous end noses he says belong to the insensitive and swinish sharp-tipped ones to the irascible large rounded obtuse ones are indicative of magnanimity slender hooked noses belong to the eaglelike noble but indicate a grasping character snub noses show the owner to be of luxurious habits open nostrils are a sign of passion.

Aristotle's error was that of mistaking mere coincidences for causal relationships as was true of all of his successors in this prophetic branch of folklore ranking with palmistry astrology and phrenology. Thus it was assumed without reason that when one person with an outstanding physical trait had a certain associated personality make up another individual with the same distinctive feature would also have a similar disposition.

The early Arabians contributed to the literature of physiognomy notably in the writings of Rhazes Averroes and Avicenna in his *De Animalibus*. The sixteenth century was especially prolific in publications on this subject among them being the works of Andreas Corvus and Giambattista della Porta to mention but a couple. In the seventeenth century however with the development of a better knowledge of anatomy interest in physiognomy dwindled as fiction and fancy were being supplanted by fact.

During the eighteenth century the decline in interest was still greater as a matter of fact physiognomy was even becoming discredited in certain quarters. As an amusing historic sidelight George II in 1743 at a time when witches were still being burned at the stake by act of Parliament stigmatized as unlawful the pursuit of physiognomy and declared that all rogues and vagabonds professing skill in it were to be publicly whipped or sent to a house of correction.

Sir Charles Bell in 1806 in an essay on the *Anatomy of Expression* made the first truly scientific investigation of the physical manifestations of emotion as transferred by the facial muscles and foreshadowed the growth of the physiologic school.

Cross (1819) of Glasgow wrote a defense of scientific physiognomy based on general physiologic principles.

Duchenne (1862) the distinguished French neurologist demonstrated that by the use of electricity the action of the individual facial muscles could be studied and represented by means of photography confirming experimentally many of Bell's hypothetic deductions.

Herbert Spencer (1855) in his *Psychology* speculated on the connection between physical and psychic states

Darwin (1872) in *The Expression of the Emotions in Man and Animals* approaching the subject from an evolutionary standpoint formulated a number of principles which he regarded as fundamental. Expression he believed represented a survival of actions useful under conditions provoking the emotions. Accordingly he spoke of them as serviceable associated habits. Experiences inducing like emotions it follows would be expressed in the same way.

Cesare Lombroso Italian criminologist maintained that the criminal represented a special type standing midway between the savage and the insane and that he possessed a higher percentage of physical and mental defects than did the noncriminal due partly to degeneracy and partly to atavistic regressions. These *stigmata of degeneracy* stamped the criminal as a type who he felt could be identified as such. These views have long since been discarded.

Closely related to physiognomy is phrenology which presumes to discover individual talent by examination of the shape and configuration of the head. This is based on the belief that mental life is dependent on the brain and is divisible into separate faculties each of which has a definite localization in the brain. Any protuberance or bump on the skull indicates a corresponding degree of development of the underlying area and supposedly denotes the presence of a superabundance of the quality represented by that particular region.

The manner in which Gall and his follower Spurzheim built up this really fantastic system in 1800 is at once amusing and self incriminating. By the casual examination of skulls of friends and those of criminals and the insane he plotted out some 35 areas which he regarded as representative of as many different qualities such as amateness combative ness self esteem benevolence cautiousness philoprogenitiveness (love of one's children) and so forth. The observations were made in the following offhand manner.

Because one of his friends with a facile tongue had rather prominent eyeballs he therefore ascribed the language function to this area. He similarly located the causality area as an inch or so above the eye following the study of the head of Fichte and a bust of Kant. At church he noted that those who prayed with the greatest intensity had prominences on the vertex of the skull. Ecclesiastics of vacillating temperament were observed to have conspicuous parietal eminences where he forthwith localized the seat of cautiousness. The combative area was found when he discovered a cranial protuberance common to several ill bred pugna

cious fellows whom Gall experimentally stimulated with alcohol. He rejoiced and was convinced beyond doubt when he found a similar swelling in the same region in a rather intemperate young Turk.

Public fancy is so captivated by this new and simple approach to an age-old problem that by 1802 there were 29 sober and serious



Fig. 1.—Hippocratic facies. (Courtesy Mr. Hamlin Bailey, F.R.C.S.)

phenologic societies in Great Britain alone and a host of learned journals were published proclaiming their revolutionary discoveries to a waiting world. Indirectly, however, phrenology was of some value in that it stimulated an interest in the physiology of cerebral localization.

Gall though mistaken in his theories was no doubt sincere but probably was led away by his unbridled premature enthusiasm. For it is at once a human virtue and a human failing to seek short cuts; this mixed blessing and curse has led to no end of progress and to no end of trouble. While the alchemists were searching for the philosopher's stone that would transmute base metal into gold the apothecary was attempting to concoct an elixir of life that would confer eternal youth and philosophers were endeavoring to formulate universal laws and grand synthesis.



Fig. 2—Postencephalic paroxysm on a mask face

ing principles the physiognomist and phrenologist likewise were reducing human character as reflected in the facial features to an occult system and rule of thumb.

Since remotest antiquity the physician has been observing the effect of disease on the countenance. As this engrossing subject is to be treated in a more extended manner in a subsequent section only a few historic comments will be made at this point. When discussing origins in medi-

cine it is customary and even traditional to go back to Hippocrates (460-357 B.C.) the venerable Greek physician so aptly styled the Father of Medicine who was a most astute observer and clear thinker. He it was who gave us the first clear cut description of the characteristic facial expression in approaching dissolution spoken of now as the *hippocratic facies* (Fig. 1) which with its sharp nose, sunken temples, cold ears, hollow vacant eyes, open mouth, loose, blanched lips and livid, muddy color (noted particularly in the terminal stages of acute generalized peri-



Fig. 3—Facies in pronounced exophthalmic goiter. (From Thorek's Modern Surgical Technique, J. B. Lippincott Co., publishers.)

tonitis) is the unmistakable seal of death, the handwriting on the wall which the physician sadly reads.

The English physician James Parkinson (1755-1824) was the first to describe paralysis agitans or shaking palsy, calling attention to the rhythmic tremor and the generalized muscular rigidity which among other things resulted in an immobile expressionless face bearing the eponymic designation of parkinsonian mask (Fig. 2). This also occurs as a sequela of the lethargic type of epidemic encephalitis more commonly known as sleeping sickness which is not to be confused with the African disease of that name due to trypanosomiasis.

Karl von Basedow (1799-1854), a German physician, clearly recognized exophthalmic goiter as a clinical entity, pointing out the protuberant eyeballs and the wide eyed, unblinking stare, that gives such a startled look to the face, as being a characteristic feature of the disease (Fig. 3).

Sir Thomas Spencer Wells (1818-1897), a pioneer English gynecologist, described the *facies ovarica*, or *Wells' facies*, with its drawn, pinched expression occurring in a woman suffering from an ovarian tumor.



Fig 4—Characteristics of Hutchinson's teeth in congenital syphilis (Courtesy Dr J H Hess)

Sir Jonathan Hutchinson (1828-1913), an able, versatile English physician who was expert in many fields, graphically described the so called "hutchinsonian facies," resulting from the stigmata of congenital syphilis of which it is diagnostic. The prominent frontal bosses, depressed nasal bridge, scars radiating from the angles of the mouth, the interstitial keratitis, and the typical notching of the permanent upper central incisor teeth constitute such a striking and pathognomonic picture that once seen it is not easily forgotten (Fig. 4).

Pierre Marie (1886), the brilliant Parisian neurologist, in collabora-

tion with his former teacher the famous Charcot described the peroneal form of progressive muscular atrophy since called the Charcot Marie Tooth Type. In the same year he demonstrated the pituitary origin of acromegaly. The description of his case remains classical. The large feet and spade hands and the coarse elongated features with the broad enlarged projecting lower jaw. Even today nothing can be added to his description. It is of further interest to note that Pierre Marie also gave original descriptions of hypertrophic pulmonary osteoarthropathy (Hyp-

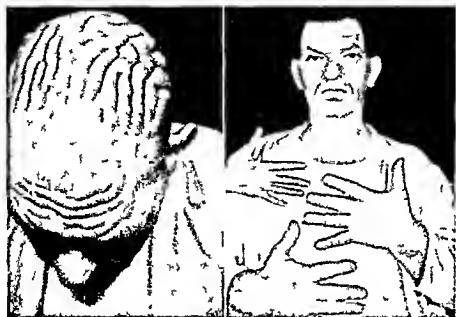


Fig 5—Left Charcot Marie-Tooth facies. Right, acromegaly (Courtesy Dr Daniel Leventhal.)

poocrates centuries before noted the clubbed fingers) hereditary cerebellar ataxia and spondylitis rhizomelica or osteoarthritis involving the spine (Fig 5).

Emil Kraepelin (1881) who brought order out of chaos in the field of psychiatry in differentiating and classifying the dementia precox and manic-depressive psychoses pointed out the importance of constitution or body build as a factor in disease (Figs 6 and 7). From this the concept of diathesis or an innate constitutional predisposition to a disease or group of diseases spring up. A generation or so ago there was much discussion of exudative rheumatic, and lymphatic diathesis. The *facies amabilis* (Fig 8) was described. It was characterized as a mobile oval face with lustrous eyes, heavy eyebrows and bluish sclerotics and once was regarded as indicative of a predisposition to tuberculosis. Overly anxious



Fig 6—Facies in dementia praecox and manic depressive psychoses

overimaginative clinicians then arose who prided themselves on their ability to diagnose all diseases by inspection of the face alone. Thus is it always in human history the pendulum of enthusiasm swings widely from one extreme to another until its excursions become limited and a happy medium is reached.

Just as the ancient philosophers as well as the physiognomist and phrenologist sought to find in the study of the face an answer to the mysteries of human character and destiny, just as the criminologist saw in it a solution to his problems, just as the artist and poet found in it a challenging protean subject, so too did the physician seek to read and understand the lines engraved on the face by disease in order that he might the better limit its progress.

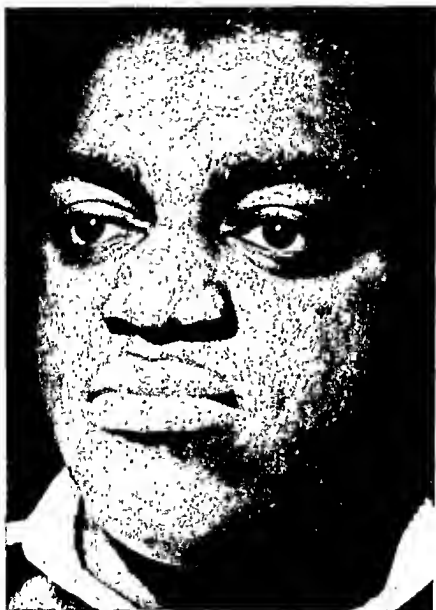


Fig. 7.—Dementia praecox. Nineteen-year-old colored boy who heard the "voices of his conscience." Had feelings of unreality and depersonalization. Believed he had been transformed into a devil. Indulged excessively in fantasy and reverie of a self-glorifying character. Notice pouting lips.



Fig 8—*Facies amabilis* in pulmonary tuberculosis in Negro woman
Note cachexia and large, brilliant eyes

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CHAPTER II

EMBRYOLOGY

THE FACIAL MUSCLES are striated voluntary groups which are not concerned in the movements of bones or joints. Between the fifth and eighth weeks of the embryo's development, the human face begins to take form. The muscles involved are part of the dermal musculature, although they have their embryologic derivation from the parietal muscles. This portion of musculature is known as the *panniculus carnosus*. This panniculus is best developed in mammals and by it they are able to contract various portions of their peripheral anatomy and thereby dislodge insects, foreign invaders, and other bodies. In the upper classes of mammals the panniculus carnosus is restricted to the head and neck. The portion covering the neck is known as the *platysma myoides*, which has its origin in the subcutaneous tissue of the neck and by continuous and contiguous growth division, and subdivision gives rise to what is known in the face as the 'muscles of expression'.

The embryologic source of the primordia of the face originates from the upper branchial arches. A splitting or bifurcation then occurs of the first branchial arch. The arches are small ridges which are separated by groove-like depressions. These are found to occur on the lateral surfaces of the lower cephalic region, or what later will be termed the neck. The branchial arches are comparable to the gills of fish and are separated by depressions known as clefts through which flows the life-giving respiratory liquid from which the oxygen is extracted and exchanged for carbon dioxide. In the arches themselves, a thickening of mesoderm occurs, gradually the dorsal aspects of the arches become fused, to form what later will become the side of the neck, and these arches attach themselves to the lower aspect of the processes which later develop into the side of the head, each affixing itself to the corresponding side. The ventral division of the arches becomes fused to give rise to the midline of the neck. (Figs 1 and 2)

In the chick embryo and in sections of the human embryo, there are six arches in all referred to as the visceral or branchial arches but only four of these are apparent even upon close external scrutiny. The nomenclature concerned with the arches differs markedly, however, anatomists and embryologists agree to refer to the first arch as the mandibular arch and to the second as the hyoid arch. A ring of cartilage is laid down on either side of the arches, together with the branches corresponding to the primitive aortic arches which are derived from the aorta.

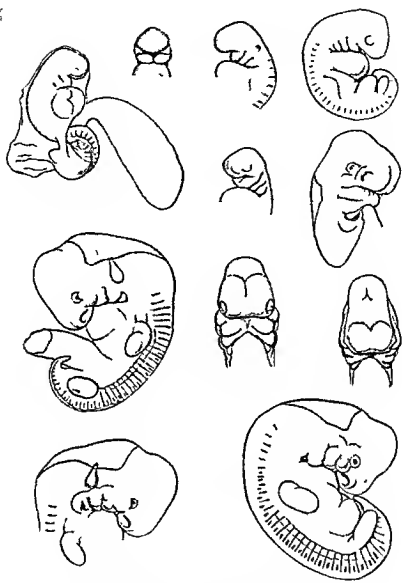


Fig. 1--Embryologic development of the face. (From Bach.)

The upper end of this primitive digestive tube is known as the *stomodæum*; anterior to this is the first or mandibular arch, from which the lower jaw and corresponding labial processes, the associated muscles of mastication, and the anterior third of the tongue soon begin to form. The mandibular cartilaginous ring, present also in all the other arches, is known as *Meckel's cartilage*, both right and left, depending upon the side of its appearance.

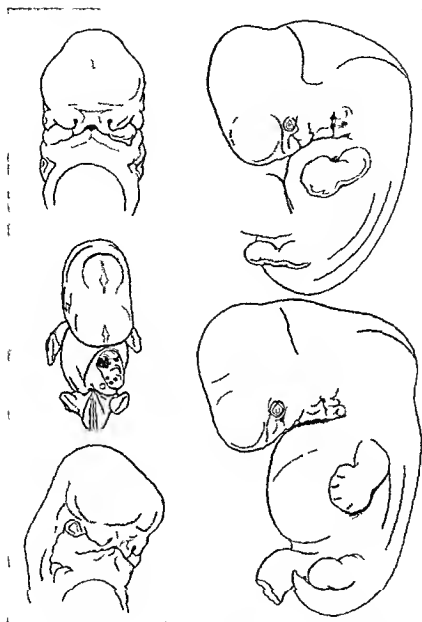


Fig 2—Embryologic development of the face (From Bach)

The dorsal ends of the cartilage are fused and together with the primordia of the capsule of the ear, form two of the three small *ossicles of the middle ear*. The ventral portions of the cartilage are fused to form the *symphysis menti*.

The maxillary process is a small process which at its beginning is white triangular in shape and arises from the mandibular arch at its dorsal ends. The triangular process grows upward and forward on either

side and fuses at a later time to form what is known as the *chiel* and only a small portion of the upper lip at its lateral aspect on either side. The medial surface of the *lips* arises from the median right and left nasal processes which will be discussed later. The hyoid or second arch sends out diverticula which aid in forming the missing portions of the side and front of the neck. The cartilage associated with the arch aids in the formation of the styloid process the inferior cornua a small part of the body of the hyoid bone and the stylohyoid ligament. The stapes also arises from this source. The labyinthine cartilaginous ring contributes to the formation of the stapes and adds to the base of the hater. The upper portion of the cartilaginous ring fuses with the temporal bone which then in turn gives rise to the styloid process alluded to above.

The third arch called by some embryologists the first branchial arch aids in the formation of the body and superior cornu of the hyoid bone. It is derived from the primitive or rudimentary ring of cartilage which is laid down with the arch. The third arch also contributes to the formation of the *thymus* and inferior *parathyroid bodies*. The fourth and fifth arches are responsible also in the formation of the superior parathyroid bodies and the thyroid cartilage.

It must be remembered that the various layers of the groove and arches contribute to various lesser viscera and visceral linings not mentioned thus far.

The epithelium of the mouth face and associated structures in its origin from *ectoderm* and *entoderm* whereas the skeletal muscular and vascular systems take origin from *mesoderm*. The first arch or pouch furnishes primordia to the epithelial derivatives of the external auditory meatus which is derived from the ectodermal portion of the branchial groove. The ectodermal covering of the arch itself gives rise to the epithelium derivative of the stomodaeum epidermis of part of the cheek and upper lip part of the auricle of the ear enamel of the lower teeth the protid covering the maxillary and mandibular processes and epithelium for the submaxillary and sublingual glands. The entodermal lining of the first pouch aids in the development of the epithelial lining of the body of the tongue and part of the mouth the entodermal portion of the pharyngeal pouch gives rise to the epithelium of the *tympanic cavity* and *auditory tube* and from the floor arises a small primordium for the *thyroid*. As far as the mesodermal derivatives are concerned from the first arch or pouch generates the maxillary process including the *upper jaw teeth* and *palate* and also the mandibular process including the *lower jaw teeth malleus incus* and *sphenomandibular ligament* which all concern themselves with the skeletal system.

The muscular system derived from the first arch or pouch concerns only those muscles supplied by the fifth nerve, or the *muscles of mastication*. The vascular supply from the first arch becomes obliterated and is of no significance in later embryonic life.

The second arch or pouch has the ectodermal portion of the groove and is concerned with the presence in the adult of many anomalous *cysts* or *fistulae*. The ectodermal portion of the arch itself affects the formation of the rest of the *auricle* and in part the epidermis of the arch. From the entodermal lining of the second arch, the epithelium of the root of the *tongue* and part of the *pharynx* are formed, while the entodermal portion of the pouch itself gives origin to a portion of the future palatal tonsil.

The mesodermal derivatives of the second arch concern the skeletal system and form the *stapes*, *styloid process*, *stylohyoid ligament*, and lesser horns of the hyoid bone. The muscular derivative of the mesodermal derivatives of the second arch goes to form the *muscles of expression*, all of which are supplied by the seventh nerve. The vascular supply to this arch also becomes obliterated. The ectodermal epithelial derivatives of the third and fourth arches disappear in the cervical sinus but concern only the ectodermal covering of the branchial groove and covering of the arch itself. The ectodermal lining of the third and fourth arches contributes to the epithelial covering of the root of the tongue, pharynx, and part of the epiglottis, while the entodermal portions of the third and fourth pharyngeal pouches aid in the formation of the thymus and both superior and inferior parathyroid bodies.

The mesodermal derivatives concerned with the skeletal portion of the third arch contribute to the body and greater cornua of the hyoid bone. The third pouch contributes, through the medium of the mesoderm to the formation of the muscles of the pharynx supplied by the ninth nerve. The vascular system here is derived from the third arch of the lower portion of the internal carotid artery. The mesoderm of the fourth arch is contributory in the formation of the muscular system (the muscles of the pharynx and the larynx supplied by the tenth nerve), of the skeletal system (the cranial portion of the thyroid cartilage), and of the vascular system (the arch of the aorta on the left side and the subclavian artery on the right). There is no ectodermal branchial groove to the fifth arch because it is not visible externally, but the ectodermal covering of the arch aids in the formation of the epidermis of the neck. The entodermal lining of the fifth arch contributes in part to the formation of the *trachea* and *primordial lung buds*.

The ectodermal portion of the pharyngeal process forms the ultimo branchial bodies. The bodies separate themselves and then begin their

caudad migration finally developing into a portion of the thyroid gland and together with the fourth arches contribute to the formation of the parathyroids. The ultimobranchial bodies degenerate and disappear after the second month in the human.

Most anatomists and embryologists concede that the following occurs in the interior wall when the embryo lies in the supine position: an area of ectoderm begins to proliferate on either side of the midline; these are termed *olfactory pits*. The pits themselves occur in about the middle of the frontonasal process, thus dividing each frontonasal process into paired lateral and median *nasal processes*. His termed the lateral angles of the median nasal process which are rounded off the *globular processes*. The epithelial ectodermal lining of the olfactory pits become the lining ectoderm of the *nasal cavities* except for the lining epithelium of both inferior meati. The globular processes of His become projected laterally and ventrally and become known as the *nasal plates* or *limbæ*. The large *frontonasal processes* are soon to form a large portion of the anterior aspect of the head and face as they gradually approach the midline the nasal plates face to form the *nasal septum*; the globular processes of His then become fused and form the *philtrum* or central portion of the *superior labial process*. The portion of the median nasal process which is located between the *processes of His* is somewhat flatter and depressed below the other level at the point of fusion. This later becomes the *columella* or inferior portion of the nasal septum. Lateral to this and on either side in the form of steps the future apex and bridge of the nose is noted. The lateral *alae nasi* are formed by the lateral nasal processes which are on either side of the olfactory pits.

The origin of the maxillary process as already stated forms the inferior and lateral walls of the *orbit*. The other bones which help to form the orbit and become ossified with it are the *zygomatic* and the *maxillary bone* itself. The *opiconasal furrow* which extends from the medial aspect of the eye to the lateral aspect of either nasal plate and to the olfactory pit separates the maxillary process above for a time from the lateral nasal processes which gradually fuse. The nasal cavity on its lower lateral aspect is also bound by and owes its origin to the *maxillary process*. The *primitive palate* originates from the maxillary and nasal processes fusing in the roof of the primitive oral opening. The right and left maxillary processes fuse with their respective globular processes and the lateral nasal processes to form the nares at their posterior aspect and also the superior labial process at its lateral aspect. The nares open permanently only after the degeneration and disappearance of the epithelial processes which fill them from the twelfth to twentieth weeks of the existence of the embryo.

The intimate anatomy of the nares is developed by and in the lateral nasal process. The olfactory pits which extend backward and lateral from above the stomodeum, are closed at their posterior aspects by the bucconasal membrane. The perforations of these form the openings between the pits and the stomodeum, known later as the *choanae*. From the internal aspect of the maxillary processes a pair of processes occur which, when developed, complete the floor of the nasal cavity and are known as the *palatine processes*. These combine with the above, completing the *palate* except for the formation in front by the *premaxillary bones*.

The broad extent of the lateral angles of the mouth reaches to either side of the midcheek region. This is reduced during the later fusion of the jaw. When the processes of the lower jaw are fused completely, a median forward prolongation becomes known later as the *chin*. Invaginations occurring about the fifth to the seventh weeks just in back of the *lips* separate them from the gum margin.

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CHAPTER III

EVOLUTION OF THE FACE

THE HUMAN FACE with its kaleidoscopic mask an inspiration to poet and artist since time immemorial is not just a happy accident or glorious afterthought of nature but is rather the consummation of eons of painstakingly slow tedious evolutionary development. It arose from simple beginnings out of the necessity for a center of reception for stimuli in the capture of prey. From the primitive need for food the mouth developed and the special sense organs eyes nose and ears appeared in order that this all important biologic demand could be more efficiently satisfied. Secondly the face assumed importance for the lure of a mate. Thus it played a rather significant role in both self preservation and protection.

While the fact of organic evolution is no longer disputed by the unprejudiced and thoughtful student who is offered an overwhelming mass of evidence from paleontology comparative anatomy, embryology blood precipitation tests genetics and the geographic distribution of animals in support of the doctrine that man has evolved from lower forms the exact mechanism whereby some of these changes have come about is still not altogether clear. Charles Darwin in 1859 published the monumental *Origin of Species* a masterly record of careful investigation and inductive logic and postulated the theory of natural selection. He maintained that in the struggle for existence as Malthus pointed out because of the discrepancy between food supply and the animal population those modifications or variations most adapted to their environment would tend to be propagated. This is termed by Spencer the survival of the fittest which would result eventually in the development of new species. To explain the origin of secondary sexual characteristics not accountable for on a strictly utilitarian basis he introduced the concept of sexual selection.

While the persistence of favorable variations was thus plausibly explained their ultimate origin was still obscure. Weismann promulgated the theory of germinal continuity asserting that variations originated in and were solely transmitted by the germ plasma. Others notably Carl von Nageli believed in a progressive almost mystic evolutionary trend occurring irrespective of natural selection. The mutation theory championed by the Dutch botanist De Vriese emphasized the importance of mutants or sports i.e. marked variations from the original type in the development of new species. The effect of use and disuse and the inheritance of acquired characters still remain controversial points.

Even in living forms of the present an idea as to the probable course taken in the development of the face can be gained. As stated in foregoing paragraphs, the mouth formed the keystone of the triumphal arch that was to be the face. It appears in the lowly unicellular protozoans as a mere

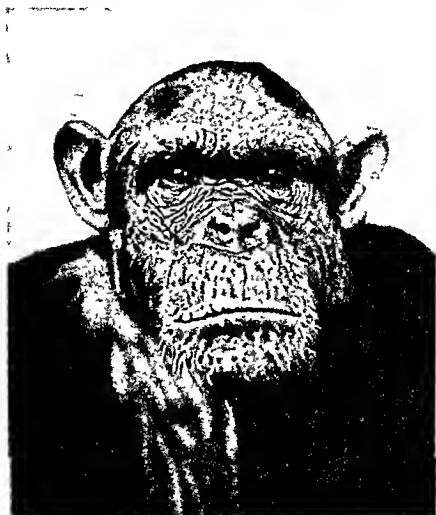


Fig 1—Theodore Chimpanzee of Dr S Voronoff

gash in their protoplasmic side. The mouth of the jellyfish, a two layered, more complex organism, becomes surrounded by tentacle like folds which aid in engulfing the sustaining microscopic tidbits. In the worms a head begins to appear in rudimentary design. To the early reptiles we are indebted for the development of the upper and lower jaw plan, teeth made their debut in sharklike forms. In the remote past before man's advent, the forebears of the mammals were probably long snouted, insect-eating, opossum like creatures, and in the arboreal primates a shift of the eyes

towards the middle of the face occurred because of the urgent need for acute vision in rapid tree climbing. Biconjugate stereoscopic vision developed in the anthropoid apes. Quaint and almost human are the interestingly diversified faces of the surviving primates which appear like caricatures ranging from the fiercely savage face of the gorilla to the picturesquely senile faces of some of the old world monkeys (Fig. 1).

In the lemur and lower primate forms a *rhinarium* or moist patch occurs at the end of the snout and the upper lip is divided by a midline notch. This rhinarium becomes converted into the mucous lining of the true nose with the reduction in size of the muzzle which is designed for foraging in the soil but which is valueless in an arboreal existence. The upper lips become joined and develop the highly protrusile character seen in the anthropoids due to the marked development of the *orbicularis oris muscle* which encircles the mouth and proves useful not only in sucking up water and the juices of plants but also in expressing anger, rage, joy, grief and other primitive emotions. With the descent of the primates from the trees and the coordinated use of the eyes and hands in manipulation a corresponding progressive enlargement of the brain eventually took place.

The bony framework of the face even in the earliest mammals soon became covered with a soft flexible skin to which were attached the facial muscles. Phylogenetically speaking these muscles represent the forward extension of the *sphincter colli* muscle, a thin sheet surrounding the neck in reptiles and innervated by a branch of the seventh cranial nerve which migrates forward and subdivides with the growing muscle mass. In addition to forming the *platysma* in mammals the muscle grows forward over the cheeks and sends extensions that close the eyes and move the ears and lips, every new subdivision being accompanied by its own branch of the facial nerve. The facial or mimetic muscles reach the zenith of their development in man and become a most sensitive mirror for the reflection of emotional states.

The evolutionary doctrine presumes that structural similarity betokens genetic relationship in which case the existing anthropoid apes must have had a common ancestry with man but the popular statement that man is descended from monkeys is grossly inaccurate. No biologist maintains that man originated from any living species of anthropoid ape; the assumption is rather that man and the apes both descended in some remote past from a common progenitor, the popularly designated missing link, and that later each followed a divergent line of development.

The dramatic story of man's evolutionary ascent from this ancient ape-like form while a most fascinating one indeed is nevertheless very frag-

mentary and disjointed as no consecutive series of skeletal remains have been discovered as yet depicting the various stages in this process. It is, therefore, manifest that no one knows exactly how man's primitive ancestors looked. A fair idea may be obtained from reconstructions based on the rather uncommon human fossil remains; but, since in many instances these are incomplete, or poorly preserved, many of the reconstructions are accordingly purely conjectural and open to dispute.

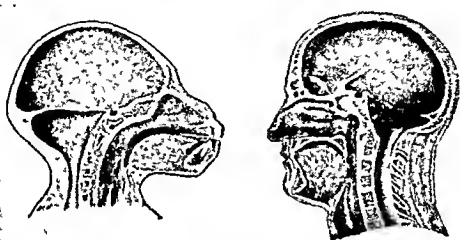


Fig 2—Left, young gorilla showing prognathism, retreating forehead, small cranial cavity. Right, modern man. Vertical face, prominent nose, high forehead, ample cranial case (After Klaatsch, reproduced from Osborn)

That the face, however, underwent profound modification is patent. The marked change noted in the facial angle or profile is outstanding. This angle is formed by an imaginary line extending from the external auditory meatus to the floor of the nasal cavity and another line from the middle of the forehead to the anterior aspect of the alveolar process of the maxilla, which can be measured by a device called a *goniometer*. If the angle is 80° or more, as generally obtains in the human race, the condition is termed *orthognathous*; if the angle is between 80° and 65° or less, as occurs in the anthropoids, fossil man, and occasionally in contemporaneous individuals with an abnormality, it is spoken of as *prognathous* (Fig. 2). The loss of the prognathism of man's apelike forebears was due to the development of the chin prominence, the disappearance of the heavy supraorbital ridge or "beetle brow," and the filling out of the receding forehead as a result of the increasing intelligence denoted by the enlarged frontal lobes. The nose from a broad, flat, inconspicuous structure was converted into a prominent facial feature with the elevation of its bridge and tip. The lips became out-rolled, showing the vermilion

border and a midline furrow or philtrum appeared in the upper lip. The canine teeth lost their tusklike character and no longer projected beyond the others and the zygomatic or temporal arch diminished in size and strength.

At this juncture it might be well to review in brief the better known fossil prototypes of man, the vast majority of which, however, still lie



Fig. 3—Profile view of the head of the *Pithecanthropus*, the Java ape man, after a model by J. H. McGregor (Osborn).

interred in their ancestral dust awaiting exhumation for the complete unfolding of the stirring epic of man's metamorphosis from some hairy inarticulate apelike beast who was just learning how to walk upright.

Of these the *Pithecanthropus erectus* or *Java apeman* (Fig. 3) is probably the most primitive yet discovered. The remains consisting of the calvarium or skull cap, left femur and two molar teeth were found in 1891 by Dubois, a Dutch army surgeon, in a river bed under 50 feet of strata near Trinil in the East Indian Island of Java. The various fragments, although at the same level, were some distance apart, belonging

no doubt to different individuals but probably of the same species. Their estimated age according to some paleontologists is about a million years placing them in the pleistocene era. At that time Java was in all probability connected with the Asiatic mainland regarded by most authorities as the cradle of mankind. The *Pithecanthropus* in addition to being a

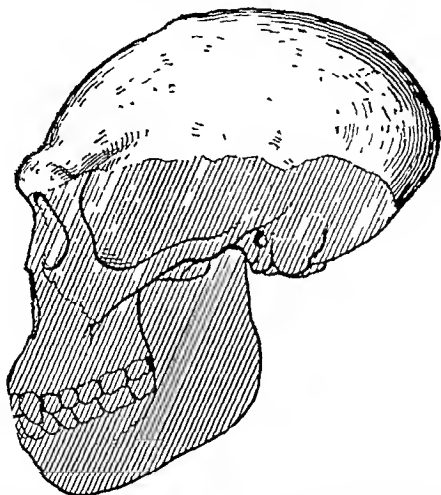


Fig. 4—The skull of *Pithecanthropus* as restored by J. H. McGregor, showing the original (shaded) and restored (black lines) portions. About one half life size. (Osborn.)

transitional prehuman form is doubtless as well the primitive collateral ancestor of the existing anthropoids namely the gibbon orangutan chimpanzee and gorilla. Because of the remarkably straight femur it is assumed that the Java apeman walked erect and was terrestrial in habits. The skull is dolichocephalic; i. e., long for its breadth with a low receding forehead and prominent supraorbital ridge. Its endocranial capacity determined by making a plaster cast of the inside of the skull and measuring the cast's volume is estimated to be around 850 to 900 cc. or about

two-thirds that of the average for modern man. The teeth appear distinctly human, the dental arch apparently approaching the human in type. Reconstructions of the Pithecanthropus face based on these inadequate fossil remnants are necessarily fanciful to a large extent and are not particularly flattering to the owner, for the facial appearance is much that of the ape as its name indicates for which reason it was not included in the genus *Homo* or man (Fig. 4).



Fig. 5—Heidelberg man. Restored by Mascré under the direction of Prof. A. Rutot, Brussels. (Osborn.)

The oldest European representative of the human race yet unearthed is the *Heidelberg man* or *Homo heidelbergensis* (Fig. 5). The specimen consists solely of a complete lower jaw and was found in 1907 by Otto Schoetensack in the Marter sands near Heidelberg about 80 feet below the surface together with numerous fossil bones of extinct mammalian species namely primitive bison, rhinoceros, elephant, etc., which aided greatly in the estimation of the antiquity of the specimen which is believed to be less than one half as great as that of the Java apeman. The associated warm climate fauna places it in the second interglacial period around 375,000 years ago. The mandible was of the massive, chinless variety.



Fig 6—Restoration of the head of the Neanderthal man of La Chapelle aux Saints in front view, after model by J H McGregor (Osborn)

much larger and sturdier than any present day human jaw and belonged, no doubt, to an adult male because of its heavy construction. The presence of erosion or wearing down of the teeth indicates long usage. The ramus or ascending portion of the jaw is quite broad as in the existing anthropoids. The teeth, proportionately small for the jaw, are all close set, with tops flush, and unquestionably human. The presence of eoliths or crude stone implements in the same strata in which the Heidelberg jaw was found, indicates the level of cultural development attained by these

primitive men of the early Stone Age. In the Heidelberg man we find a distinct advance over the Java apeman. A definitely human type had now evolved but the face was still altogether lacking in the prominence of the chin which was not to develop until considerably later.

The Neanderthal man or *Homo neanderthalensis* is so-called because it was discovered in the limestone caverns of the Neanderthal ravines in Rhenish Prussia near Düsseldorf in 1858 (Figs 6 and 7). Almost perfect

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Fig. 7—Restoration of the head of the Neanderthal man of La Chapelle-aux Saix in profile after model by J. H. McGregor (Osborn.)

specimens were found in sharp contrast to the preceding forms represented only by stray fragments and they aroused much ferment in the scientific world at that time as to their exact significance. Virchow, the renowned pathologist who was also much interested in archaeology, maintained that the distinctive skeletal features were the result of disease. Huxley, on the other hand, a stout protagonist and self-styled bulldog of Darwin, insistently insisted that they were primitive representatives of the human race despite bitter opposition and disheartening criticism from all quarters.



Fig 8—The Neanderthal skull from La Chapelle aux Saints, side, front, and top views
(After Boule, reproduced from Osborn)

Subsequently, other similar, if not identical, specimens of the Neanderthal race were brought to light in many parts of western Europe, for example at Spy, in Belgium (hence they were called the "*men of Spy*"), as well as at Krapina, in Croatia, at Le Moustier, La Ferrassie, La Chapelle aux Saints (Fig 8), and La Quina in France, and at Gibraltar. Neanderthal men differed in no great respect from the previously described forms from which they were removed by only several rungs on the

evolutionary ladder. They were a short statured but big-chested, broad shouldered, stockily built race that walked upright and probably communicated with each other in some primitive fashion. They made crude flint implements and reverently buried ornaments with their dead, suggesting



Fig. 9—Restoration of the head of the Pittedman, full front, after model by J. H. McGregor (Osborn)

gesting the dawn of belief in immortality. Like the Java apeman, the Neanderthal man had heavy overhanging superorbital ridges with a low receding forehead. The prognathous jaw, while thick and heavy, was less massively constructed than that of the Heidelberg man. The chin, though practically absent, was in the process of developing. A variable dentition is noted in the Spy specimens; the teeth are quite small, whereas in the

La Chapelle remains they are really massive. The rather unprogressive Neanderthal race appeared on the scene during the third Interglacial Period and became extinct between 25,000 and 35,000 years ago. The face of the Neanderthal man bore only too plainly the mark of its simian



Fig. 10—Restoration of the head of the Piltdown man, in profile, after model by J. H. McGregor (Osborn)

ancestry, and the facial angle had not appreciably changed from that of the anthropoid type.

The *Piltdown man* or *Eoanthropus dawsoni* was discovered in 1912 in the Thames gravel just below the surface at Piltdown, in Sussex, England, by Charles Dawson, a local lawyer (Figs. 9 and 10). The remains included a portion of a very thick human calvarium, part of a lower jaw with two intact molar teeth, together with several other fragments and remains of fossil animals. The precise age of the specimens is very difficult

to determine, but they are thought to be geologically contemporaneous with the *Peking man* or *Sinanthropus pekinensis*. Both of them were certainly not much higher than the Java apeman. The discovery of the Peking man was quite accidental and romantic indeed. Schlosser, of



Fig. 11—The head of the Cro-Magnon type of "*Homo sapiens*," a race inhabiting southwestern Europe from Aurignacian to Magdalenian times. (After J. H. McGregor.) (Osborn.)

Munich, in 1903, purchased some "dragon's bones" from a druggist in Peking, China, and found them to be the teeth of some hitherto unknown species of anthropoid ape, or primitive man. Subsequent excavation of the fossil-bearing cavern near Peking from which they were originally

obtained led to the discovery by Pei a Chinese scientist of an almost complete human cranium of great antiquity

The *Rhodesian man* or *Homo rhodesiensis* unearthed in 1921 in Bone Cave near Broken Hill in northern Rhodesia Africa is represented



Fig. 12—Restoration of the head of the Old Man of Cro Magnon in profile modeled after the type skull of Cro Magnon Dordogne with the teeth restored and the head given a younger appearance (After the model by J. H. McGregor) (Osborn)

by a practically perfect adult male skull which is remarkable in the tremendous development of the brow ridges. The *foramen magnum* situated at the base of the skull and transmitting the spinal cord is located farther forward than that in the Neanderthal race indicating that the posture of the former was more erect than that of the latter despite the other sub

neanderthaloid features of the skull. According to G. Elliott Smith the Rhodesian man represents the parting of the ways between Neanderthal man and modern man.

In the *Cro Magnon man* we find the first primitive representative of *Homo sapiens*, the self-laudatory title conferred on the existing species of man (Figs 11, 12 and 13). The *Cro Magnon* race, a truly magnificent one, flourished between 25,000 and 10,000 B.C. during the Upper Paleo-

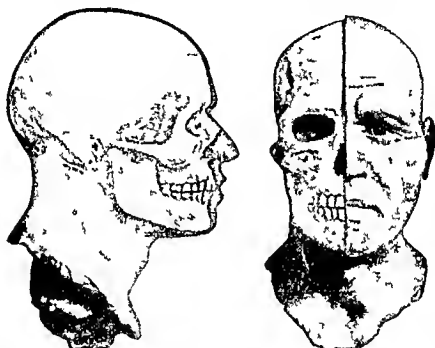


Fig. 13—Head of the Old Man of Cro-Magnon, rejuvenated by restoration of the teeth, showing the method of restoration of the features adopted by J. H. McGregor. The diameter of the head across the cheekbones is seen to be greater than that across the cranium. (Osborn.)

lithic era or later cave period of the Old Stone Age. Specimens were first found in Gower, Wales, in 1823, and at Aurignac, France, in 1859, and the discovery of five skeletons at Cro-Magnon, France, in 1868 established the race definitely. They were a very tall, large-brained people, exceeding in both respects the averages for modern Europeans. Their faces were broad but short; their foreheads were no longer sloped or beetle-browed like their predecessors, but instead were quite well developed, the facial angle being almost identical with that of modern man. Although their cheekbones were prominent and their chins pointed and narrow, their features were not altogether unattractive, judged even by

our standards. The sum total of their facial characteristics however approaches the Asiatic most closely in type with a suggestive Negroid aspect in contradistinction to the *Grimaldi race* found in the Grimaldi Cave near Mentone Italy. The races of fossil men in Europe doubtlessly represent successive migratory waves of invasion from some forms in central Asia the birthplace of the human race. After the decline and disappearance of Cro Magnon man whose vivid art still adorns cave walls Europe was repopulated in the Upper Paleolithic period by the so-called Mediterranean or narrow headed and the Alpine or broad headed types which were most likely differentiated in Asia.

From Cro Magnon man to modern man there is but a short step indeed if not measured in terms of years or life spans but as stated the facial characteristics of the Cro Magnon are very similar in the main to those of present-day man and the subsequent changes were merely in the nature of improvement or refinement in the plan already laid out.

It is impossible to predict what future changes will occur in the face but that they will occur seems self evident for the evolutionary process has not been completed and will give rise beyond doubt to new and more glorious creations in the millenniums to come.

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CHAPTER IV

MIMETIC MUSCULATURE

FACIAL EXPRESSION IN MAN with all its infinite modulations is dependent on the so called mimetic musculature which is derived embryologically from the second branchial or hyoid arch and is innervated by the *seventh or facial nerve*. It is phylogenetically related to the primitive *sphincter colli* muscle in the neck region of the reptiles. This muscle in the course

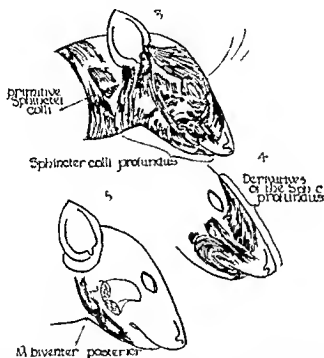


Fig. 1—The plan of the superficial facial musculature. Note in 3 the primitive sphincter colli, the primary matrix of the entire superficial facial musculature. From this the sphincter colli profundus has been shed, which in turn has given rise to various groups of superficial facial muscles (4). In 5 the deep facial musculature completely separated from the superficial facial musculature, the conditions found in marsupials and some primitive placentals is shown. (Courtesy of Dr. Ernst Haeber, *Evolution of Facial Musculature*, Johns Hopkins Press, 1931. Redrawn and rearranged by H. West and the author.)

of evolutionary development migrated forward into the face region along with the facial nerve and subdivided into various muscle groups, locating themselves principally about the facial orifices. These muscle groups differentiated progressively until finally even small muscle bundles were able to contract independently of the others, thus permitting the fine shades of emotional expression (Fig. 1).

Huber says "The story of the evolution of the muscles of facial expression is the most fascinating story of which I know." It is only in relatively recent times that research on the facial musculature has reached great importance.

Galen's (131-201 A.D.) description of these muscles was extremely fragmentary. During the Renaissance Leonardo da Vinci included not



Fig. 2—Facial folds: the result of contractions of the muscles of the face

a single figure of this muscle group in his anatomic sketches. Vesalius's (1514-64) description was very sketchy. Santorini (1681-1737) made a scientific anatomic investigation of human facial musculature. Albinus (1697-1770) brought out a series of important details and illustrated these muscles with artistic figures.

Through succeeding investigators the facial musculature gradually became known; however, knowledge of the muscle group to which our

of which there are 14, 12 paired ones (the maxillary, zygomatic, nasal, lachrymal, inferior concha, and palate), the mandible, and the vomer. The bones of the face are not all superficially placed as their names might imply, the palate, vomer, and inferior nasal concha are rather deeply situated but are grouped along with the others for the sake of convenience. The cranial bones also participate in the formation of the bony facial framework. The frontal region or forehead is formed by the frontal bone, while the temple or temporal region is composed of the frontal, parietal, greater wing of the sphenoid, and the squamous portion of the temporal bone. The cheeks, although chiefly supported by the zygomatic, malar, or cheek bones, are also formed in part by the maxillary and temporal bones. Conspicuous anatomic features of the facial skeleton are the roughly oval apertures of the orbits, the pear shaped or piriform nasal aperture and the movable lower jaw. The mental, infraorbital and supraorbital foramina are small, circular bony openings located respectively in the lower and upper jaws, and the supraorbital regions in a line at the junction of the inner and middle third of the superciliary ridge. These are for the transmission of branches of the fifth or trigeminal nerve which is the chief sensory nerve of the face (Figs 3, 4, and 5).

The face is divided into the frontal, temporal, orbital, zygomatic, nasal, oral, and mental regions, terms which require no further amplification.

The facial muscles, in addition to the epicranium and the auricular muscles, include those associated with the respective orifices of the eyes, nose, and mouth. Those about the eyes and mouth resemble sphincters. The *epicranial* or *occipitofrontalis* muscle arises from the superior curved line of the occiput and the *galea aponeurotica*, a tendinous sheet covering the convexity of the skull, and is inserted into the skin of the frontal region, blending with the *corrugator supercilii* and the *procerus*, formerly known as *pyramidalis nasi*. Transverse wrinkling of the forehead results upon the contraction of the *frontalis* muscle. The *anterior*, *posterior*, and *superior auricular* muscles, originally intended to move the ears so that they could receive sound waves more advantageously, are rudimentary in man and are functional in relatively few individuals, who, as a rule, take great pride in this atavistic achievement, which is valuable, however, only for social amusement (Figs 6a and b, 7a, b, and c, and 8a and b).

The *platysma*, although not a facial muscle in the strict sense of the term, being chiefly present in the cervical region, is a thin muscular sheet originating from the skin and subcutaneous tissue over the *pectoralis major* and *deltoid* muscles in a line extending from the costal carti-



Fig. 6a—Act on of frontalis muscle. Note independent voluntary action of left side of the brow



Fig 6b—Action of frontalis muscle. Note independent voluntary action of right side of brow



Fig 7a—Action of frontal s muscle Appearance of forehead with muscle at rest



Fig 7b—Action of frontalis muscle Forehead thrown into furrows by elevation of brow



Fig. 7c—Action of frontalis muscle. Frontal's muscle relaxed. Procerus muscle contracted, throwing the root of the nose into folds

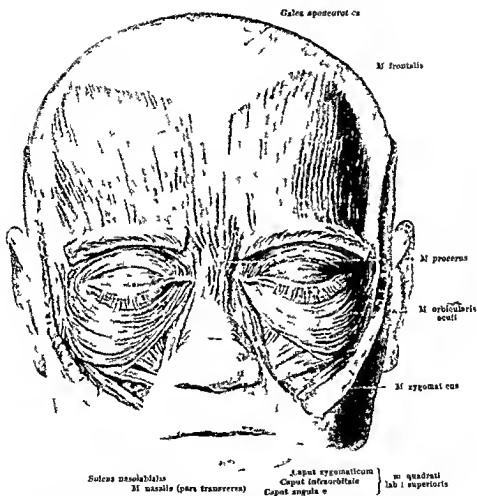


Fig. 8a—Muscles of the head and face viewed from in front (From Spalteholz Hand Atlas of Human Anatomy, J. B. Lippincott Co.)

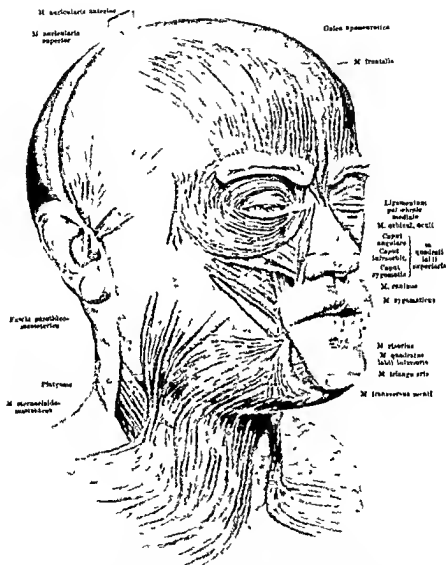


Fig. 8b—Muscles of the head and face, viewed somewhat from the right (From Spalteholz, Hand Atlas of Human Anatomy, J. B. Lippincott Co.)

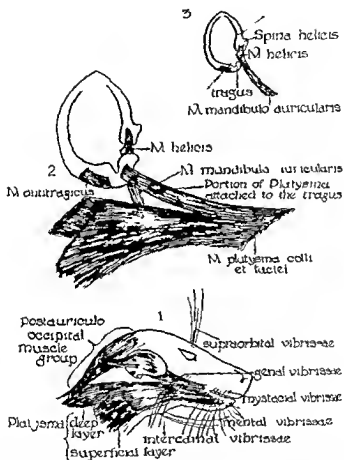


Fig 9—Scheme of the primitive primate ground plan of the superficial facial musculature, based on investigations of the Lemuriodea *Tarsius*, and primitive platyrrhine monkeys. The platysma and its derivatives (Courtesy of Dr Ernst Huber. *Evolution of Facial Musculature*, Johns Hopkins Press, 1931. Rearranged and redrawn by H. West and the author.)

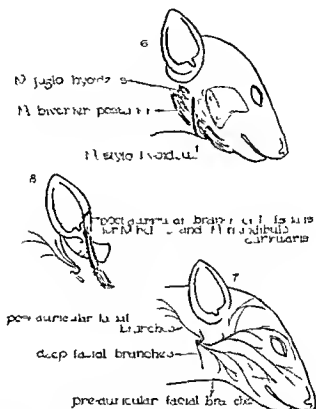


Fig. 10—Fig. 6 shows the deep facial musculature, completely separated from the superficial facial musculature found in most placentals. Nos. 7 and 8 show the ramification of the n. facialis which corresponds to the phylogenic differentiation of the facial musculature. The entire facial musculature is under control of the facial nerve. (Courtesy of Dr. Ernst Huber. *Evolution of Facial Musculature*, Johns Hopkins Press, 1931. Redrawn and rearranged by H. West and the author.)

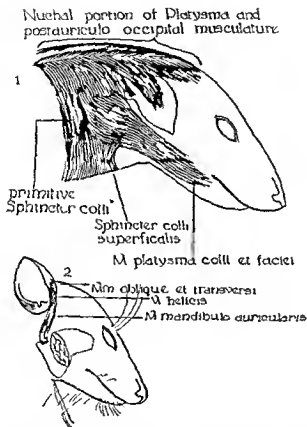


Fig. 11—Scheme of ground plan of superficial facial musculature common to marsupials and placentals, based on investigations of polyprotodont and diprotodont marsupials and primitive placentals (Courtesy of Dr. Ernst Huber. Evolution of Facial Musculature, Johns Hopkins Press, 1931. Redrawn and rearranged by H. West and the author.)

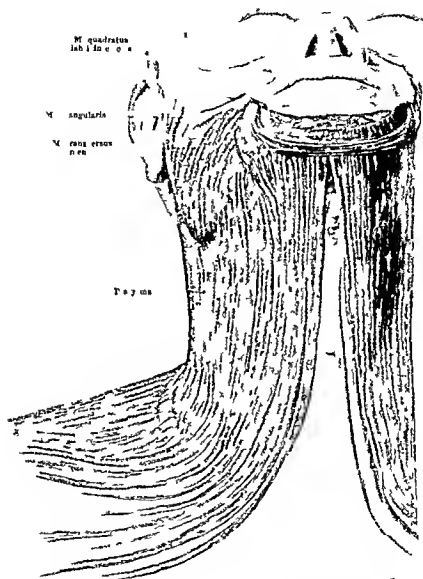


Fig. 12—Right platysma viewed from in front. (From Spalteholz, *Hand Atlas of Human Anatomy*, J. B. Lippincott Co.)

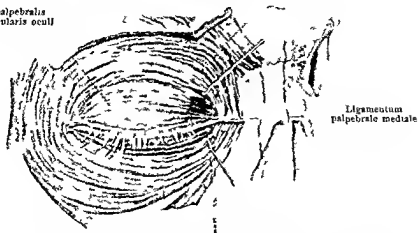
lage of the second rib to the acromion process. The fibers course upward and inward, entering the body of the mandible from the symphysis to the masseteric insertion. Some of the posterior fibers, however, merge with the fascia of the cheek (*parotideo-masseteric fascia*) and with the muscles about the angles of the mouth. Supplied by the cervical branch of the facial nerve, it draws the lower lip downward and outward upon con-

Pars orbitalis m orbicularis oculi

Eyebrow

M corrugator

Pars palpebralis
m orbicularis oculi



Pars lacrimalis m orbicularis oculi

(The overlying parts of the pars orbitalis have only been drawn to one side)

Fig 13—Muscles of the right eyelid viewed from in front (From Spalteholz)

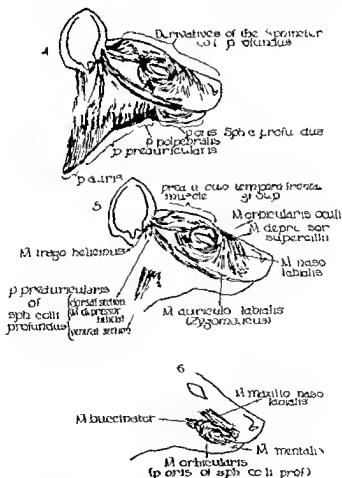


Fig 14—The sphincter colli profundus and its derivatives (Courtesy of Dr Ernst Huber 'Evolution of Facial Musculature, Johns Hopkins Press, 1931 Rearranged and redrawn by H West and the author)

traction simultaneously elevating the skin of the neck from the underlying structure, and depressing the mandible to a degree. This muscle is called into play in the expression of horror and intense surprise (Fig 12)

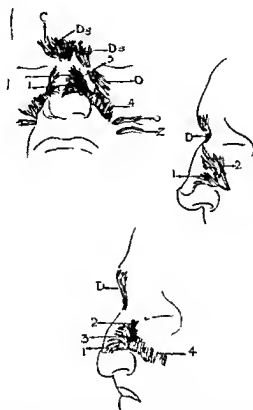


Fig 15—Facial muscles (after Hans Virchow) C, Corrugator supercilii Dg, depressor glabellae (procerus) Ds, depressor capitis supercilii O, a portion of the orbicularis oculi Z, zygomaucis (major) Nos 1 to 5 show portions of muscle which run to the upper groove of the alae nasi and to the nasal labial fold in various manners (Rearranged and redrawn by H. West and the author)

The chief muscle of the eyelid is the *orbicularis oculi*, an elliptical sphincter like muscular sheet encircling the palpebral fissure or eye slit and originating at the medial angle of the orbit. This muscle enters at the lateral angle and lies between the tarsus or dense fibrous plate of the eyelid and the skin. An orbital palpebral and lacrimal portion are recognized the latter also called *Horner's muscle*, compresses and empties the lacrimal sac. The main body of the muscle in action approximates the upper and lower eyelids as in winking or closing the eyes. Some individuals however due to defective innervation or muscular control are unable to close the eyes separately. The *levator palpebrae*

superioris or elevator of the upper lid supplied by the oculomotor nerve is inserted into the upper margin of the tarsus and the skin at the middle of the lid. The *corrugator supercilii*, which throws vertical furrows into the skin of the forehead, arises from the nasal portion of the frontal bone and enters the skin of the eyebrow (Figs 13 and 14)

The muscles of the nose include five rather small, feeble, insignificant muscles, one of which is common to both the nose and the upper lip. They attain their maximum development in the Negro race. They are—

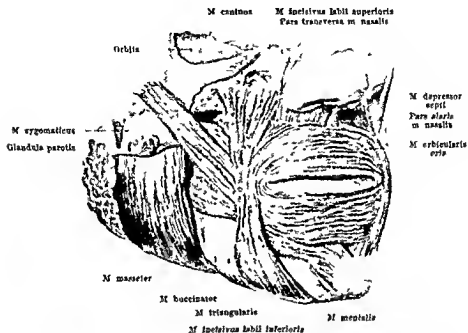


Fig 16—Muscles of the region of the mouth, viewed somewhat from the right side. (*Platysma, risorius, quadratus and orbicularis oculi* have been removed) (From Spalteholz, "Hand-Atlas of Human Anatomy," J. B. Lippincott Co)

(1) *Procerus*, arising from the epicranial muscle and the skin over the glabellar region, and entering the fibrous membrane covering the cartilaginous framework of the nose; (2) *nasalis*, formerly called the *compressor naris*, originating from the maxilla under the *quadratus*, passing over the nasal bridge, and ending in the aforementioned fibrous insertion, uniting it with the muscle on the opposite side; (3) *dilatatores naris*, weak, muscular lips on the lateral margins of the nares or nostrils, one placed anteriorly and the other posteriorly; (4) *depressor alae nasi*, arising from the canine fossa of the maxilla and dividing into two parts, inserting into the ala and nasal septum or *depressor septi*; and (5) *caput angulare*, formerly known as *levator labii superioris alaeque nasi*, which represents

M. quadratus labii superioris M. incisivus labii superioris
 M. cunius M. orbicularis oris
 M. buccinator



Platyra

M. triangularis

M. mentalis

M. quadratus labii inferioris M. incisivus labii inferioris

Fig. 17—Muscles of the region of the mouth, viewed from behind. (The tissues about the mouth have been loosened from their bony substratum and the muscles have been dissected out from the posterior surface.) (From Spalteholz' Hand Atlas of Human Anatomy, J. B. Lippincott Co.)

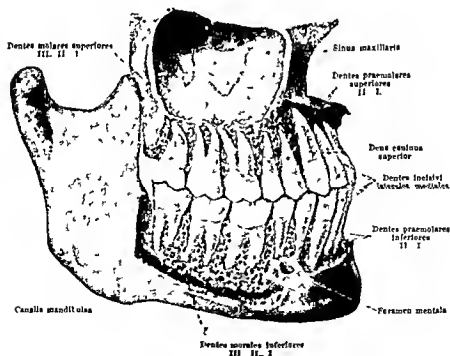


Fig. 18—The permanent teeth viewed from the right. (The external layer of bone has been partly removed and the sinus maxillaris has been opened.) (From Spalteholz, "Hand Atlas of Human Anatomy, J. B. Lippincott Co.)

one of the heads of origin of the quadrate muscle of the upper lip arising as a narrow muscular band from the frontal process of the maxilla passing alongside the nose and entering into both the ala and the *orbicularis oris* (Fig 15)

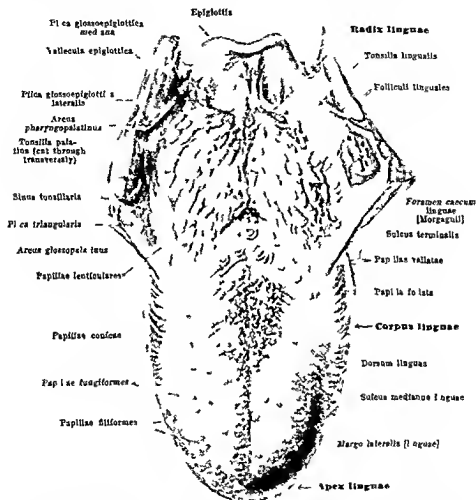


Fig 19—Tongue viewed from above (The palatine arches and the palatine tonsils have been cut through transversely) (From Spalteholz "Hand Atlas of Human Anatomy" J B Lippincott Co)

The action of these small and not especially important muscles may be either inferred from their names or surmised by their attachments. It is of interest to note in passing that in acute lobar pneumonia the dilators of the nostrils are not infrequently called into play in a compensatory effort to combat the anoxemia. Respiratory dilatation of the *alae nasi* may also occur in bronchopneumonia of childhood as well as in asthma and obstructive dyspnea.

The muscles of the mouth include quite a number of different muscles all of which, with the exception of the *orbicularis oris*, are bilateral. They may be enumerated as follows. *Orbicularis oris*, *quadratus labii superioris*, *caninus*, *zygomaticus*, *quadratus labii inferioris*, *risorius*, *triangularis*, *mentalis*, and *buccinator* (Figs 16, 17, 18, 19, and 20).

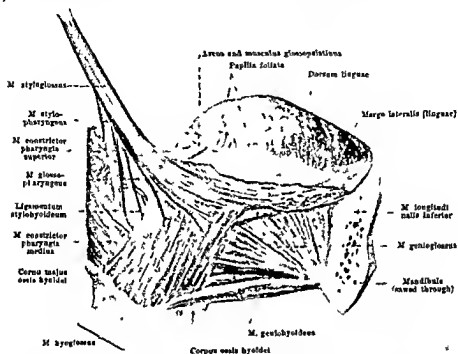


Fig 20—Musculature of the tongue viewed from the right (The right half of the lower jaw, the *m. mylohyoideus* and the salivary glands have been removed) (From Spalteholz, *Hand Atlas of Human Anatomy*, J B Lippincott Co.)

The *orbicularis oris*, or a small disc, is an elliptical, strongly developed muscle occupying the thickness of the lips between the skin and the buccal mucosa. It merges with the other facial muscles converging at the mouth, and has skeletal attachments formed by three groups of muscle fibers occasionally regarded as distinct muscles. These are the nasolabial band attached to the nasal septum, the superior incisive bundle arising from the incisor fossa, and the inferior incisive bundle from the mandible on either side of the symphysis. The *orbicularis oris* approximates the lips and closes the mouth, the peripheral fibers protrude the lips. The other muscles at the lateral commissures or angles of the mouth act as dilators of the buccal cleft. Paralysis of these muscles innervated by the facial nerve interferes with articulation, especially of labial consonants, and causes dribbling of saliva from the sagging angle of the mouth.

The *quadratus labii superioris* (Fig. 22), in addition to the *caput angulare* previously described, has two other heads of origin. The *caput infraorbitale* attaches to the maxilla above the *infraorbital foramen*, concealing the *infraorbital vessels* and nerves as it passes downwards and



Fig. 21—Powerful development of the orbicularis muscle in a Negro.

joins the *orbicularis oris* between the *caput angulare* and the *caninus*. The *caput zygomaticum*, as its name, of course, implies, arises from the zygomatic bone; it inserts along with the preceding muscle into the *orbicularis oris*. In conjunction with other muscles it elevates the upper lip and plays a significant rôle in the expression of grief.

The *caninus* which raises the angle of the mouth originates from the canine fossa of the maxilla under cover of the *caput zygomaticum* and inserts into the *orbicularis oris* and the skin at the cleft of the mouth.

The *zygomaticus* is a narrow muscular slip arising from the outer portion of the zygomatic bone passing obliquely downwards and for wards its fibers terminating by interfacing with those of the *triangularis caninus*, and *orbicularis oris*. It draws the angle of the mouth upward and outward as in laughing or smiling.

The *quadratus labii inferioris* is a quadrilateral muscle arising from the lateral aspect of the mandible beneath the canine and premolar teeth is partially overlapped by the *triangularis* enters the skin of the lower lip and merges with the *orbicularis oris*. It depresses or draws down the lower lip.

The *risorius* is a thin flat triangular muscular sheet a continuation in part of the *platysma* on the face. It arises from the *parotido masseteric* fascia and the integument of the cheek and passes transversely forwards to the angle of the mouth where it blends with the *orbicularis oris* and *triangularis* and unites with the skin. Its name aptly describes its function.

The *triangularis* originates from the outer aspect of the mandibular body and is continuous with the *platysma*. The fibers pass upward converging at the angle of the mouth where they enter the *orbicularis oris* and contiguous muscles. The action of the *triangularis* muscle is to draw the angle of the mouth downward and slightly outward as in the expression of sorrow.

The *mentalis* a small muscle which takes its origin from the mandible below the incisor teeth terminates in the integument just above the point of the chin. It draws the skin of the chin upwards when it is combined in action with the *triangularis* on both sides it gives an appearance of brightness and contempt and has been designated the *superbus* muscle. Slight contraction produces an expression of firmness and determination. In children its faint quivering oftentimes presages a deluge of tears and vocal lamentations.

The *buccinator* forms the lateral wall of the cheek and is also grouped with the muscles of mastication which include in addition the masseter external and internal pterygoids and the temporal muscles. The buccinator a rather thick quadrilateral muscle immediately subjacent to the mucous membrane of the cheek is covered by the buccopharyngeal fascia and is separated from the *risorius* and *zygomaticus* by a fairly large and extensive fat pad the *corpus adiposum buccae* (of Bichat). The buccinator is pierced by the parotid duct and the buccinator branch

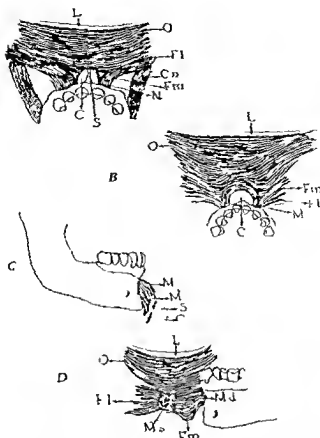


Fig. 22—A, Appearance of musculature of upper lip after it has been displaced upward. Seen from below (After Hans Virechow). C, Space occupied with adipose tissue between the two nasal muscles. The fat has been removed. Cn, Caninus. FI, Lateral lip bundle of musculature of nasalis (incisivus superior). Fm, Mesial bundle of lip musculature of the nasalis curving toward and transgressing the median line. L, Vermilion border of the lip. N, Nasalis muscle close to its origin. O, Orbicularis oris. S, Nasal spine together with a small portion of the cartilaginous septum.

B, Appearance of musculature of the lower lip after latter has been displaced downward. Viewed from above. C, Space filled with adipose tissue between both mental muscles, the fat has been removed. FI, Lateral lip bundle of the mentalis muscle (incisivus inferior). Fm, Mesial lip bundle of the mentalis muscle curving toward the median line which it transgresses. L, Vermilion border of the lip. M, Mentalis muscle close to its origin. O, Orbicularis oris muscle.

C, Mentalis muscle on the right side after removal of its lateral lip bundle. C, Skin. M, Mentalis muscle. M, Zone in which muscular fibers become very fine and are intertwined closely with connective tissue bundles. S, Thick subcutis.

D, Appearance of musculature after dissection and displacement of the lower lip and mental portion. Seen from behind. FI, Lateral lip bundle of the musculature of the nasalis (incisivus superior). L, Vermilion border of the lip. Md, Right mentalis muscle, which was permitted to remain attached to the bone. MS, Left mentalis muscle detached from the bone, permitting one to observe the dissected muscle bundles in their transverse course. From this point on the bundles diverge. O, Orbicularis oris.

(Redrawn and rearranged by H. West and the author.)

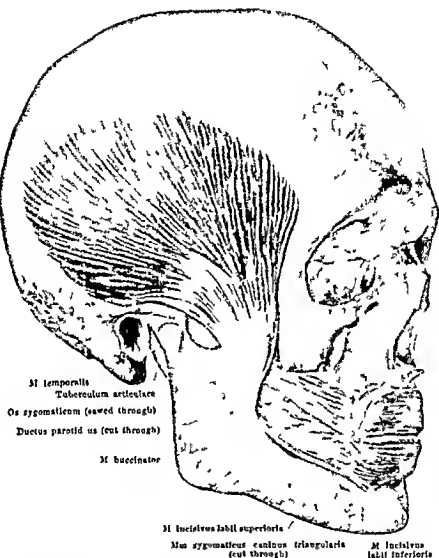


Fig. 23—M. buccinator and m. temporalis viewed from the right side. (The arcus zygomaticus has been sawed away at its origins, the joint of the lower jaw having been opened at the same time.) (From Spalteholz' Hand Atlas of Human Anatomy, J. B. Lippincott Co.)

of the trigeminal nerve which is distributed to the buccal mucous membrane. Arising from the alveolar arches of the maxilla and mandible and the pterygo-mandibular raphe, the buccinator blends with the orbicularis oris, drawing the angle of the mouth laterally, pressing the lips against the teeth, compressing the contents of the mouth, serving to keep the food between the teeth and preventing it from accumulating between the cheek and the teeth (Fig. 23).

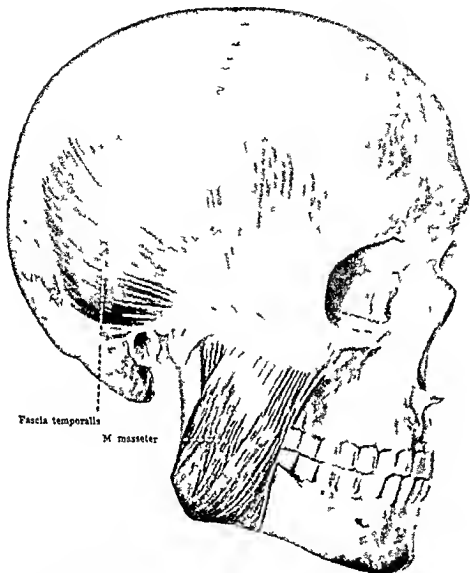


Fig. 24—Fascia temporalis and masseter muscle viewed from the right side
(From Spalteholz Hand Atlas of Human Anatomy J B Lippincott Co)

The *masseter*, although chiefly a muscle of mastication helps to fill out the posterior portion of the cheek and upon firm contraction as in clenching the teeth its vertical anterior border becomes visible and serves as a landmark for the palpation of the external maxillary artery where it crosses the mandible. This artery, as well as the superficial temporal artery because of the convenience of location is frequently employed by anesthetists to observe the patient's pulse reactions during the anesthetic. The masseter covered to a large extent by the parotid gland originates mainly from the zygomatic arch and enters on the

lateral surface of the rimus and angle of the mandible. Its action is to close the mouth (Fig. 91).

The corner or angle of the mouth or *modiolus* because of the convergence of the muscle bundles from the *buccinator*, *triangularis risorius caninus quadratus* etc. is the most mobile point of the buccolabial musculature. This is necessary because of the strength and precision of the lip movements required in articulate speech. The area about the mouth is moreover most important in emotional expression.

RACIAL CHARACTERISTICS

Physical anthropologists have given much attention to body proportions, physiognomy, skin and hair, and above all to the skeletal system with emphasis on the skull, but they have greatly neglected study of the soft parts. Skeletal material is abundant. Material for racial anatomic studies on the soft parts is now being utilized in recent times. Huber comments as follows: "In research on the racial anatomy of the muscle system the study of the facial musculature is undoubtedly the most fascinating one and it is to be hoped that this fascinating field will be given adequate consideration in future editions of text books of physical anthropology."

Racial characteristics appear early in fetal life and are more evident in the facial muscles than in any other part of the muscular system. In the black race as typified by the American Negro the facial muscles are more coarsely bundled, darker, more powerfully developed and more extensive though less differentiated than in the white. This lack of differentiation makes a fine modulation of facial expression difficult and is most conspicuous in the mid face region of the Negro where the zygomaticus muscle mass though strongly constructed is not separated into the component muscle groups as in the case with the white race but is broadly connected with the *orbicularis oculi* and extends backwards towards the preauricular region. The *orbicularis oculi* is tremendously developed forming a powerful muscular disc the supraorbital portion of which exceeds the inferior orbital part whereas in the white the reverse condition obtains. Then too the superficial temporal and occipitofrontal muscles are also better developed and more extensive although the muscles of the supraorbital and glabellar regions are more strikingly uniform than is the case in white persons. The *triangularis* is more massive and the *risorius* more constant than in the white race. The Negro nose is more heavily muscled, the *platysma* thicker and the buccolabial musculature is particularly bulky. The whole neuromuscular mechanism is not as finely developed as in the white race which together with

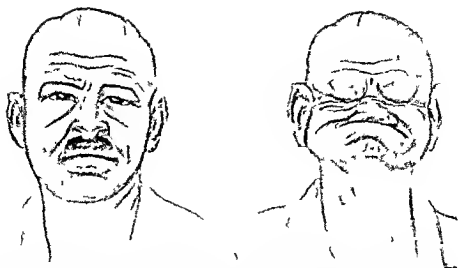


Fig 25—Changes in facial configurations resulting from the ability of an individual to dislocate his lower jaw at will in any direction (Redrawn from photographs of Dr Rene Sommer in his work on 'Traumatic Dislocations of the Joints,' published by Ferdinand Enke, Stuttgart)



Fig 26



Fig 27

Fig 26—Adult male, American Negro (Johns Hopkins Anatomical Laboratory) Distinct and racial characteristics are here noticeable which contrast with the features usually encountered in the Caucasian (compare next figure) (Courtesy of Dr Ernst Huber Evolution of Facial Musculature, Johns Hopkins Press 1931 Rearranged and redrawn by H West and the author)

Fig 27—Adult male, Caucasian (dissected in the Department of Anatomy of the University of Zurich Switzerland) (Courtesy of Dr Ernst Huber Evolution of Facial Musculature, Johns Hopkins Press 1931 Rearranged and redrawn by H West and the author)

the thicker skin makes delicately shaded expressions the exception rather than the rule. Strong powerful contractions of a rather primitive type as characterized by the broad, grinning smile with the hearty laugh are typical of the Negro (Fig 26)

As contrasted with the Negro the facial muscles of the *Caucasian* are more delicately bundled of the gracile type. The superficial temporal



Fig 28



Fig 29

Fig 28—Adult, male Papua Melanesian. The Papua Melanesian exhibits primitive features similar to those of the Negro contrasted with those of the Caucasian (After Fuchs [1927]. Courtesy of Dr Ernst Huber. *Evolution of Facial Musculature*. Johns Hopkins Press 1931. Rearranged and redrawn by H. West and the author.)

Fig 29—Adult male Australian (Modified after Burkitt and Lightoller [1926-27]. Courtesy of Dr Ernst Huber. *Evolution of Facial Musculature*, Johns Hopkins Press 1931. Rearranged and redrawn by H. West and the author.)

muscles are greatly reduced and the zygomaticus muscle group has separated into the *zygomaticus* and *quadratus labii superioris*. Especially noteworthy is the marked variation existing in the muscles about the eyes and mouth making for greater individuality and range of expression. Some individuals it is true cannot independently contract the brow, i. e., the *superioris* and *glabellar* muscles without closing the eyes due to the associated contraction of the *orbicularis oculi*, as is the case in the ape. It is thus evident that the greater the differentiation of the facial muscles the greater are the scope and animation of facial expression. Some of the facial muscles have during the course of evolutionary development undergone regression as witnessed by the muscles that

move the scalp and ears which have long since lost their racial usefulness (Fig 27)

The *Papua Melanesian* displays many primitive Negroid features (Fig 28) The facial muscles are extensive, bulky, powerfully developed, and show a lack of differentiation in the mid face region, and the risorius is frequently absent altogether The *Australian* presents on the whole many features similar to those already described, he shows, however, a few additional significant differences (Fig 29). In the Australian the greatest width of the *orbicularis oculi* lies lateral to the center of the palpebral fissure, and the labial tractors extend almost as far as the vermillion border of the lip, the nasal muscles likewise show excessive development In the *Hawaiian* a distinctive feature, absent in all other racial types, is a peculiar median whorl in the upper part of the *frontalis* muscle (Fig 30) The *orbicularis oculi* forms a strikingly large muscular disc, the



Fig 30



Fig 31

Fig 30—Adult, male Hawaiian, as representative of the Polynesian stock (dissected by Thos McP Brown, Anatomy Department, Johns Hopkins University) As in the Negro, Papua Melanesian and Australian the facial musculature of the Hawaiian was found more extensive, more powerfully developed, and in the mid face region less differentiated, when compared with that of the Caucasian. The facial musculature is compact but not coarsely bunched as in the case of the Negro, Papua Melanesian or Australian (Courtesy of Dr Ernst Huber "Evolution of Facial Musculature," Johns Hopkins Press, 1931 Rearranged and redrawn by H West and the author)

Fig 31—Adult, male Chinese (from a joint study by Dr Ernst Huber and F H Langley, Anatomy Department, Johns Hopkins University) The Chinese also far exceeds the Caucasian in the vast extent and powerful development of the facial musculature, which is coarsely bunched as in the Negro, Papua Melanesian and Australian As in the Negro, Papua Melanesian and Hawaiian the musculature of the mid face region shows a lack of differentiation (Courtesy of Dr Ernst Huber "Evolution of Facial Musculature," Johns Hopkins Press, 1931 Rearranged and redrawn by H West and the

supratorbital and infratorbital portions being of equal width measured at the middle of the palpebral fissure. The *triangularis* muscle has a broad base mandibular origin its lateral fibers constituting a fan-shaped *risorius*. The anterior and superior auricular muscles are particularly extensive.

In the Chinese and Japanese, too, the facial muscles are more strongly developed and less differentiated in the mid face region than in the white race (fig. 31). The *platysma* extends for quite a distance into the face with some of the fibers anterior to the ear elevating upwards. The *orbicularis oculi* reaches massive proportions. The infraorbital exceeds the supratorbital portion in width and is broadly connected with the zygomatic muscle mass.

It is interesting to speculate to what extent racial differences in facial expression are dependent upon the morphologic differences outlined. Many other factors doubtless play a role such as psychologic and temperamental differences. Even linguistic differences it has been suggested effect a change in facial expression particularly about the mouth.

The Chinese and Japanese at least to Occidentals appear to have a stolid reserved almost suppressed facial expression with little apparent display of spontaneity or individuality. The American Indian likewise is characterized by masklike fixity of the facial features. The Eskimos on the other hand despite the hardships of their existence exhibit much cheerfulness spontaneity and good humor and the Hawaiians and Polynesians are justly noted for their intelligent prepossessing charming highly expressive faces.

It is needless to emphasize the great importance of such studies for the field anthropologist the ethnologist and the psychologist who endeavors to obtain a deeper insight and fuller understanding of the emotional life and general behavior of peoples belonging to the various human stocks. Here the students of several fascinating fields of human biology meet on a common ground.

FACIAL ANATOMY

At this juncture it might be profitable even at the expense of being tedious to review further a few more elementary facts concerning facial anatomy especially as regards the soft tissues blood nerve supply and surface landmarks with interpolated practical considerations. To begin with the skin of the face is thin elastic and highly vascular making it an ideal site for plastic operations since flaps do not readily necrose even when under considerable tension. Incisions of course should be made along natural folds or lines of skin cleavage so that the resulting scars will be less conspicuous. Because of their exposed position wounds

and contusions of the cheeks are quite common and by virtue of the abundant blood supply bleed profusely but also heal readily. Due to the laxity of the tissues marked swelling easily occurs particularly of the eyelids and wounds are prone to gape because the facial muscle extends into the skin and tends therefore to draw the cut edges apart. *Noma* or *cancreum oris* occurs about the mouth and is a gangrenous stomatitis causing death or great disfigurement due to loss of cheek substance (see Chapter XI)

The thickness of the skin varies in different portions of the face the thickness of the connective tissue underlying the skin also varies and the different manner of attachment of muscle and skin is a third variable. That the connective and fatty tissue underlying the skin influences the form of the face is obvious to the layman. The anatomist is however concerned with the little connective tissue and fatty cushions found between and under the muscles. They are significant to the form and mechanics of the soft parts of the face and for determining the mechanical value of the connective tissue formations without which the action of the muscles cannot be understood nor can the peculiarities of the countenance at rest be made clear. Thus artists have learned that while the muscles of the rest of the body in an anatomic preparation are shown in plastic beauty the face with skin and connective tissue removed is transformed into a grimace.

Three little fat cushions of importance form the surface and the mechanism of facial expression. (a) One at the site of the root of the nose (b) one behind the middle of the upper lip where it attaches to the nasal septum and (c) one back of the middle of the upper edge of the chin.

Numerous sweat and sebaceous glands are found in the facial integument explaining the prevalence of acne eruptions on the face especially in adolescence and of eczematous conditions in infants.

The fat pad of the cheek in infants is called the *sucking pad*. It is a collection of adipose tissue between the masseter and buccinator muscles and is supposed to support the cheek during the act of suckling. It is of interest to note that even in states of profound emaciation in the newborn this fat deposit is little affected by the generalized body wasting. This fatty depot is continuous with the temporal and deep lateral regions of the face and may act as a route of spread for infections and malignant growths to these regions. The individual variation in facial contour is dependent in part upon the amount and distribution of subcutaneous fat. In certain of the anthropoid apes the cheek pads attain tremendous development especially in the old males and these pads resemble cock's combs (Fig. 25).

The *parotid*, which is the largest of the salivary glands, is a yellowish lobulated mass situated below and in front of the ear; the greater part, however, lies posterior to the angle of the jaw. An anterior triangular prolongation extends along the *masseter* and is called the facial process. Another glandular extension, termed the retromandibular process, is quite deep seated, lying behind the upper part of the mandibular ramus below the base of the skull, and to the side of the pharyngeal wall. The parotid gland is enveloped in the dense *parotidomasseteric fascia*, a continuation of the deep cervical fascia. This fibrous sheath greatly limits the extension of suppurative processes from within the glandular substance. The parotid duct of Stenson, composed of two chief tributaries emerges from the anterior border of the gland, runs below the zygomatic arch and facial process and the transverse facial artery across the *masseter* muscle to enter the buccinator muscle, obliquely emptying in the oral vestibule opposite the first or second upper molar.

The facial nerve, after leaving the skull through the stylomastoid foramen, enters the substance of the parotid gland behind the ear and breaks up into its respective branches for distribution to the various facial muscles. This branching of the facial nerve in the parotid is spoken of as the parotid plexus, and illustrates the importance of making operative incisions parallel to its course in order to obviate the facial paralysis that would otherwise follow section or division of these branches. *Epidemic, nonsuppurative parotitis* or *mumps* is the commonest affection of the parotid. *Suppurative parotitis* may occur in the course of a sepsis, or as a postoperative complication. Mixed tumors of the parotid constitute the most frequent of the neoplasms. They produce an unsightly, at times enormously large, irregularly nodular swelling in front of and below the ear, and behind and below the angle of the jaw. Carcinoma of the parotid causes an early fixation of the gland to the skin and deeper structures. The tumor is of stony consistency and very early produces a facial paralysis from infiltration of the parotid plexus. Injury to the parotid duct which can be rolled up and down against the *masseter* when the teeth are clenched may give rise to a persistent salivary fistula. Calculous obstruction of the parotid duct causes a diagnostic postprandial swelling of the gland due to the damming of the secretion (Fig. 32).

The chief blood supply of the face is from the superficial temporal and external maxillary arteries, both being branches of the external carotid artery. The external maxillary artery can easily be palpated several centimeters in front of the angle of the jaw along the anterior masseteric border where it runs upward and inward to the angle of the mouth, and where it gives off the inferior and superior labial arteries which anastomose

with their fellows from the opposite side forming a vascular ring about the lips. Coursing medialward the external maxillary artery gives origin to the lateral nasal branch as well as inconstant buccal and masseteric branches and in the region of the inner canthus of the eye terminates as the angular artery. The superficial temporal artery can also be readily



Fig. 32—Mixed tumor of the parotid (Sultan Kuss)

palpated over the root of the zygomatic arch a short distance anterior to the ear. It divides into a transverse facial artery which emerges from the parotid gland below the zygoma in company with the zygomatic branch of the facial nerve and the parotid duct. Continuing upward accompanied by the auriculotemporal nerve the superficial temporal artery gives rise to frontal and parietal branches together with several others of lesser importance. This division occurs about two inches above the zygoma and in elderly sclerotic individuals the frontal branch is enlarged tortuous and can often be seen to pulsate visibly. This particular region is not infrequently the seat of cirroid aneurysms presenting themselves as a markedly dilated mass of blood vessels in the temporal region.

The venous drainage of the face closely follows the pattern of the arterial supply. The anterior facial vein however follows a straighter

course than the external maxillary artery to which it lies posterior. It runs from the medial palpebral cleft to the angle of the mandible. The superficial temporal vein, formed by the confluence of the frontal and parietal tributaries, accompanies the corresponding branches of the artery. Through the angular vein, a communication with the cavernous sinus is established. Fatal, infective thrombosis may occur in cases of even apparently trivial facial suppurations, especially above the upper lip.

Superficial lymph glands of the face are inconstant both as to location and occurrence. The chief lymphatic drainage of the face occurs through the anterior auricular, submental, and submaxillary group of glands, the efferent vessels terminating in the deep chain of cervical glands. The anterior auricular glands both lie superficial to the parotid gland and also are embedded in its substance. They drain the frontal and temporal regions, the upper and lower eyelids, the root of the nose, upper part of the cheek, and the lateral aspect of the auricle. The submental glands situated below the chin, superficial to the mylohyoid which forms part of the floor of the mouth and the anterior bellies of the digastric muscles drain the lower lip, anterior part of the floor of the mouth and the tip of the tongue. The submaxillary glands lie beneath the deep cervical fascia between the lower mandibular border and the submaxillary gland. They carry lymph from the upper lip, side of the nose, anterior third of the tongue, the gums and adjacent floor of the mouth. Carcinomas of the lower lip first metastasize to the submental and submaxillary nodes. In infectious conditions, the lymph glands may break down forming abscesses which must be opened.

The chief sensory innervation of the face is derived from the trigeminal nerve, the fifth and largest of the cranial nerves. It is a mixed nerve consisting of a large sensory root (portio major) and a smaller motor root (portio minor) which supplies the muscles of mastication, the mylohyoid, and the anterior belly of the digastric. The trigeminal nerve takes its superficial origin from the inferior and lateral surface of the pons by two roots which proceed forward in the posterior cranial fossa after piercing the dura mater below the attachment of the tentorium cerebelli. The sensory root conceals the smaller motor root and at the petrous apex expands into the large, crescent-shaped, flattened semilunar ganglion occupying Meckel's space and coming into relation medially with the internal carotid artery and the cavernous sinus. From the semilunar ganglion three large trunks or divisions emerge. The first, or ophthalmic, the second, or maxillary, and the third or mandibular division, which also incorporates the motor root of the nerve.

The ophthalmic nerve reaches the orbit through the superior orbital fissure where it divides into the lacrimal, frontal, and nasociliary branch. The lacrimal nerve supplies the lacrimal gland, the conjunctiva, and the skin of the lateral cleft of the eye. The frontal nerve through its supra orbital and supratrochlear branches is distributed to the skin of the forehead, root of the nose, and medial commissure of the eye. The nasociliary branch supplies the greater part of the mucosa of the nasal septum and lateral nasal wall, external filaments are distributed to the skin of the lower half and tip of the nose. The large maxillary nerve, after leaving the semilunar ganglion, gives off the middle meningeal branch supplying the dura mater of the middle cranial fossa, and then passes through the foramen rotundum at the base of the skull and traverses the pterygopalatine fossa where it gives off the sphenopalatine, posterior, superior, alveolar, and zygomatic branches. The zygomaticofacial and zygomaticotemporal branches appear on the face supplying the regions their names imply. The infraorbital nerve is the terminal branch of the maxillary, enters the inferior orbital fissure and traverses the infraorbital canal where it supplies the upper teeth through the middle and anterior superior alveolar nerves. After emerging onto the face, it breaks up into a number of terminal branches distributed to the skin of the lower eyelids, side of the nose, cheek, and upper lip.

The mandibular nerve is the largest branch of the trigeminal and contains a motor as well as a sensory component. It emerges from the base of the skull through the *foramen ovale* and gives off the spinosus branch which accompanies the middle meningeal artery and supplies the *dura mater* overlying the sphenoid and the mucous membrane of the mastoid air cells. The internal pterygoid branch and the anterior division of the mandibular nerve, with the exception of the buccinator branch, are motor and supply the muscles of mastication. The posterior division of the mandibular nerve, with the exception of the mylohyoid, is sensory. Passing downward behind the external pterygoid muscle, it gives rise to the two roots of the auriculotemporal nerve and bifurcates into the lingual nerve which supplies the side of the tongue, the floor of the mouth, and the inferior alveolar nerve which terminates as the mental nerve after emerging from the mental foramen, supplying the integument of the chin and the mucous membrane of the lower lip.

The auriculotemporal nerve supplies the skin in front of the ear and the temple, while the buccinator nerve is distributed to the integument overlying the lateral aspect of the cheek. The auriculotemporal nerve may be compressed by *parotid tumors*, causing exquisite pain radiating to the temple. In certain cases of *trigeminal neuralgia* or *tic douloureux*,

permanent relief from the excruciating paroxysms can be secured only by section of the nerve root. A posterior subtotal rhizotomy is performed proximal to the gasserian ganglion sparing the fibers to the ophthalmic division which is but rarely involved thereby obviating the subsequent development of a disabling *neuroparalytic keratitis* and *corneal ulceration*. Extrinsic pressure on the semilunar or gasserian ganglion or any of its branches or tumors of the ganglion itself will give rise to symptoms simulating trigeminal neuralgia.

Because of the importance of the facial nerve in neurological diagnosis a somewhat more extensive description of its central connections and course will be given. It is predominantly motor although a few of its fibers are also sensory. The motor fibers originate from the lower portion of the precentral gyrus which is the motor area of the cerebral cortex controlling facial movements. Each side of the motor cortex supplies both sides of the upper face whereas the lower face is supplied only by the contralateral cortex. The bilateral cortical representation of the upper facial branches explains why in facial paralysis of central origin the upper part of the face retains its movement in contradistinction to peripheral palsies in which the entire side of the face is paralyzed. The motor nucleus of the facial nerve is situated in the pons close to its point of emergence although its fibers before leaving pursue a devious course looping about the nucleus of the abducens nerve. This genu of the facial nerve produces a small elevation or facial colliculus on the floor of the fourth ventricle.

The facial nerve emerges from the lower border of the pons below the trigeminal nerve in the cerebellopontine angle in company with the sixth and eighth cranial nerves. It enters the internal auditory meatus along with its sensory root the *nervus intermedius* of Wrisberg and also with the auditory nerve. Reaching the middle ear it traverses the facial canal (*aqueductus fallopi*) of the temporal bone in the upper part of which is the geniculate ganglion. Within the facial canal it gives off a branch to the *stapedius* muscle and lower down the *chorda tympani* leaves it to communicate later with the lingual branch of the trigeminal. The facial nerve emerges from the base of the skull through the stylomastoid foramen behind the auditory meatus giving off the postauricular branch and then passes through the substance of the parotid gland dividing into three main terminal branches which form the parotid plexus or *pessanus* that supplies all the facial muscles with the exception of the elevator of the upper lid which is innervated by the third cranial nerve instead.

In the parotid gland the facial nerve spreads out fanwise and divides indefinitely into a temporofacial and a cervicofacial division. The former breaks up into a temporal and upper and lower zygomatic branch. The temporal ramus sweeps over the zygomatic arch and is distributed to *orbicularis oculi*, *frontalis*, *corrugator supercilii*, and anterior and superior auricular muscles communicating in their course with filaments from the trigeminal nerve. The upper zygomatic branch is small and inconstant and supplies the *orbicularis oculi* and zygomatic muscle as well. The lower zygomatic branch is larger and forms the infraorbital plexus below the lower eyelid by union with the infraorbital branches of the maxillary nerve. It supplies the *orbicularis oculi* zygomaticus, *buccinator*, and the muscles of the nose and upper lip. The cervicofacial division in turn gives rise to the buccal marginal and cervical branches supplying respectively the muscles converging about the mouth including the *buccinator* the *triangularis inferior quadratus orbicularis oris* and lastly the *platysma*.

In facial nerve palsies with degeneration symmetry of the face can occasionally be restored by anastomosing the spinal accessory or hypoglossal nerve with the extraparotid segment of the facial nerve. Associated movement of the neck however in case of spinal accessory anastomosis and of the tongue in hypoglossal facial nerve anastomosis should militate against a perfect functional result.

The efferent secretory or sensory fibers of the facial nerve which leave it in the facial canal supply the submaxillary and sublingual salivary glands the tear glands and the sweat glands of the face. Taste fibers are also distributed to the anterior two thirds of the tongue via the *chorda tympani*. The facial nerve also transmits deep pressure pain sensation from all parts of the face.

The chief bony landmarks of the face are the frontal eminences which are most prominent in childhood when the face is proportionately small as compared to the cranium the superciliary ridge over the orbits the glabella at the frontonasal junction (nasion) the bridge of the nose the osseous piriform aperture and orbital aperture the zygomatic arch canine fossa of the mandible and the condyle of the mandible. In old age as the teeth are lost a marked diminution in the size of the mandible occurs from absorption of the alveolar processes.

Most important of the facial skin folds are the nasolabial furrow a fairly prominent and constant groove in the cheek originating from the alar of the nose and passing downward and outward on the cheek the mentolabial furrow between the chin and the lower lip the philtrum or midline depression in the upper lip and the inferior and superior orbito



Fig. 33—Senile wrinkles

palpebral sulci. The superior orbitopalpebral fissure is a deep transverse fold formed by the opened upper eyelids at their base. The infrapalpebral sulcus arises from the inner canthus and passes onto the cheek.

Crows feet are finely radiating wrinkles occurring about the outer angle of the eye, traditionally associated with those of jovial and carefree disposition. Habitual facial expressions in time eventually become permanently engraved on the face of the wearer by means of the telltale wrinkles they produce, and in this manner one occasionally is able to

surmise something concerning an individual's character. Senile wrinkles are one of the physiologic concomitants of the aging process and are due to the loss of skin elasticity (Fig. 33).

Ranney in 1880, wrote that the physiognomy of the sick presents innumerable shades of expression. Not only do conditions of the countenance reveal the influence of the ever-varying passions on the muscles of the face in health but they may be classed as morbid phenomena possessing special significance. The existence of facial lines and wrinkles may be attributable to one of two conditions: a disappearance of the fat from the subcutaneous tissues of the face or the abnormal contraction of certain facial muscles dependent upon some apparent irritation of the motor nerves supplying the affected muscles. The wrinkles of the face (Fig. 34) may be classified into six groups as follows:

1 *The Transverse Rugae*. These are situated upon the forehead and are formed by the action of the *occipitofrontalis muscle*. They are thought to be expressive of an extreme amount of pain arising from causes outside of the cavities of the body.

2 *The Oculo-frontal Rugae*. These extend vertically from the forehead to the root of the nose and are formed by the *corrugator* muscles. They are thought to express distress, anxiety, anguish, and excessive pain from some internal cause. It is said that they furthermore indicate an imperfect or false crisis and that in attacks of acute disease an impending efflorescence and sometimes a fatal termination may be indicated by their occurrence. In those types of headache in which the pain is very excessive these rugae may exist simultaneously with the ones previously described. It is stated that when the former rugae meet with the latter abruptly during the course of an acute disease some serious lesion of the brain or its coverings is developing.

3 *The Linea Oculozygomatica (Jadlot)*. This line extends from the inner angle of the eye downward and outward passing across the face below the malar bone. It is said to indicate in children a cerebral or nervous affection and in adults some disease of the genital organs, masturbation or venereal excess.

4 *The Linea Nasalis (Line of De Salle)*. This line extends from the upper border of the upper lip downward in a direction more or less curved to the outer edge of the orbicularis muscle. This line is said to be strongly marked in phthisis and in atrophy. Its upper half (the *linea nasalis* proper) is thought to be a reliable indication of intestinal disease if extensively developed and prominent. The lower half (the *linea buccalis*) is supposed to indicate the existence of some disease affecting the

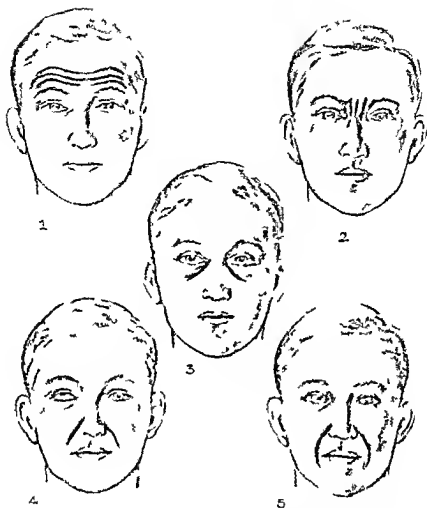


FIG. 34.—Rugae or lines of the face 1 Transverse rugae 2 The oculo-frontal rugae 3 The linea oculorygmatica 4 The linea collateralis nasii 5 The line of De Salle (After Ranney)

stomach. When this line appears conjointly with the line of Juddot it may be regarded as a positive indication of worms in children if a peculiar condition of the eye exists and a pallor of the face is present.

5. *The Linea Labialis* This line extends downward from the angle of the mouth until it becomes lost in the lower portion of the face. It is usually developed in connection with those diseases which render breathing laborious or painful and is commoner in children than in the adult as a sign of diagnostic value.

6 *The Linea Collateralis Nasi* This line extends from the nose downward to the chin in a semicircular direction. It lies outside of the *linea buccalis*, the *linea nasalis* and the *linea labialis*. It is thought to be a reliable guide to diseases of the thoracic and abdominal viscera.

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CHAPTER V

THE FACE IN EMOTIONAL AND PHYSICAL STATES

EMOTION is a highly complex elusive state of consciousness of certain bodily changes and sensations arising from a frustration or gratification of basic human urges and is expressed in overt muscular or glandular activity which in evolutionary light may be considered as preparatory to flight or combat. Our chief concern will not be with the visceral component of emotion but rather with its visible or external manifestations as reflected in the face.

That emotion may occur without recognizable outward signs is hardly possible yet it is equally true that accomplished theatrical performers may give quite convincing imitations without any genuine stimulus being present. The degree of emotionality or emotional responsiveness is of course a strictly individual matter. No two persons react in precisely the same manner or to the same degree in the presence of the same stimulus neither does the same individual under different circumstances react the same way. Because of this variability in response the exact interpretation of the emotional significance of facial expressions in others is necessarily inferential and presumptive therefore interpretation to be reliable accordingly must be based on a knowledge of the individual's personality and habitual behavior patterns. There is however enough uniformity in response to permit certain broad generalizations.

The social perception of emotion in others is and it cannot possibly be overstressed tremendously important in our adjustment to the group. Our training in this truly one of the fine arts begins in the cradle itself. The child very early in his career learns the meaning of certain looks, gestures, tones and attitudes; in a few years it readily detects signs of anger, annoyance, sorrow or pain and may in fact be aware of subtle changes in expression that escape the observation of adults who are less dependent on this sort of information. The child soon learns to conduct himself in accordance with the expressions observed in others; thus he discovers for example that his father should not be approached with new demands when in a surly or ill tempered mood.

Adults lacking in the social graces and amenities are not infrequently devoid of or sadly deficient in the ability to evaluate properly the emotional reactions of other individuals and consequently may be quite unaware that they are rude, boring, indecorous and vulgar instead of being complimentary, amusing, ingratiating and witty. The poised

tactful gracious and socially charming persons on the other hand are extremely receptive and responsive to such emotional expressions in others and conduct themselves accordingly. Some faces are delicately responsive to every mood and feeling while others are passive and immobile for example the *poker face* that reveals nothing to the observer concerning the individual's reactions.

Bell seems to have published the first objective and scientific study of facial expression. He pointed out that in the exhilarating emotions the



Fig. 1—Agony. This expression is artificially produced by electric stimulation of the muscles of expression. (From Duchenne's *Mécanisme de la Physionomie Humaine*. Dr. R. Tait McKenzie Int. Clinics 4:282, 1932.)

eyebrows the eyelids the nostrils and the angles of the mouth are raised while in the depressing passions the reverse is true.

Spencer held that the face is a good index of feeling because the facial muscles, being small and attached to easily moved parts of the body, can respond to a feeble wave of nervous excitement.

The experimental method of studying physiognomy was founded by Duchenne in 1862 who showed that by the use of electricity the action of the separate muscles could be studied and by the aid of photography accurately represented. He held that in the human being stimulation of the nerve trunk of the *facialis* could cause only a grimace and not an emotional expression. True emotional expressions he said could be demonstrated only by stimulating separate and distinct muscle groups. Thus he demonstrated by applying a faradic current to the skin of an elderly man whose face was analgesic so as to stimulate each muscle group separately and at the same time to avoid any expression of pain.



Fig 2—Hate.



Fig. 3—Joy.

In this manner he ascribed a specific expressive function to each of the facial muscles. Dumas demonstrated that a light faradic current applied to the *facialis* first produces a smile, more intense stimulation, however, tends to contract all the muscles of the face, thus producing the grimaces such as Duchenne photographed (Fig 1)



Fig. 4—Solicitude Study by the late Dr R Tait McKenzie for the head of Alma Mater in the Girard College War Memorial. Note the slight obliquity of the eyebrows, the drooping of the corner of the mouth, the beginning of the expression of grief (Int. Clinics, 4 282, 1932)

Mosso stated that the quantity of the stimulation rather than the quality of it determined the expression. Thus he demonstrated by applying increasing degrees of electrical current to the facial nerve of a deeply anesthetized dog with the result that first the muscles of the forehead and ears were contracted (mimicry of attention), then those of the nose, eye lids, and cheeks, and finally those of the upper lip and the jaw (mimicry of anger).



Fig 5—Defiance

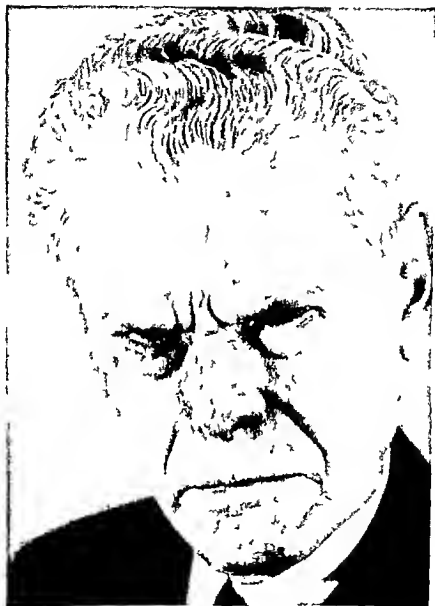


Fig 6—Distrust.



Fig. 7—Laughter.



Fig. 8—Laughter. A sketch by Rubens. A perfect interpretation of the associated action of the zygomatic major and the lower part of the orbicularis of the eye. (Dr. R. Tait McKenzie Int Clinics 4 282, 1932)



Fig. 9—Mask of laughter by Jean Carries. Illustrating the puckering of the eyelids and wrinkling of the nose which this state shares with rage and violent effort. (Dr. R. Tait McKenzie Int Clinics 4 282, 1932)



Fig 10—Disdain



Fig 11—Fear



Fig. 12—Piety.



Fig. 13—Distortion

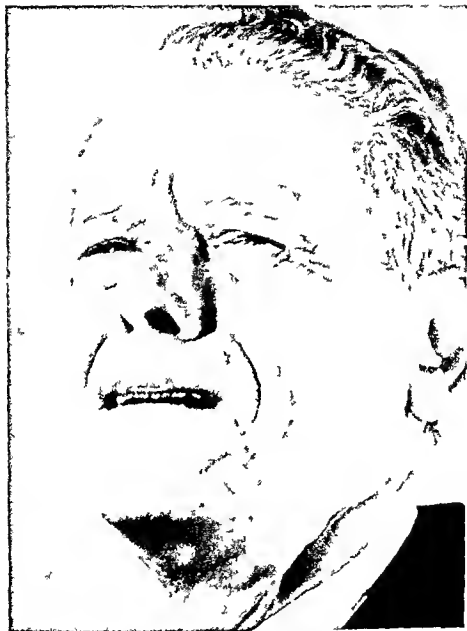


Fig 14—Suffering

At first glance it would appear that the recognition of facial expressions would be a simple matter but experimental studies have shown that even highly competent judges were unsuccessful in a rather fair percentage of cases in correctly identifying photographic reproductions of emotional reactions of talented dramatists. So-called primary emotions as love and hate joy and sorrow were more often correctly detected than secondary ones as for example defiance distrust or repulsiveness (Ruckmick 1936) (Figs 2 to 6). In addition to using photographs from such standard works as Rudolph's *Der Ausdruck der Gemütsbewegungen des Menschen* experiments were made with a mechanical face in which the nose eyes and mouth bearing different expressions could be inserted. The accuracy of judgment of even trained observers was unexpectedly low. Laughter was most frequently recognized in average of 64 per cent disgust and fear rated 36 per cent recognition and anger was correctly interpreted 30 per cent of the time (Figs 7 to 11).

Gregory states that the modern science of physiognomy if it be a science began when artists and sculptors tried to record the facial expressions of emotions and of moral character and when actors tried to reproduce these expressions. Much valuable descriptive material was thus accumulated. Expressions intended to represent piety devotion suffering anger malice joy and the like (Figs 12 to 14) may be seen in any collection of old masters or in antique treatises on physiognomy.

It was Darwin in 1872 who first embarked upon the scientific study of emotional reactions and decided that there were relatively fixed and typical facial expressions for the various emotional states. This conclusion now has been found to be of only limited validity for while there may be characteristic facial expressions of emotion in the same individual there are no typical expressions of emotional situations for people generally. Thus facial emotional expressions are determined more by the individual than by the emotional stimulus. There are to be sure learned or conventionalized methods of response leading us to believe that emotional reactions are much more uniform than they are in reality and in the interpretation of facial expressions one frequently imagines a situation that would give rise to the reaction in question. Darwin showed that man and the apes agreed in expressing equivalent emotions by means of homologous facial muscles.

Muncie states that a great deal of attention has been paid to the judging of emotion from facial expression (is the most useful division of general motility).

McDougall who viewed complementary life as the outgrowth of the instincts listed the following instinct-derived simple emotions

| EMOTIONAL QUALITIES ACCOMPANYING THE INSTINCTIVE ACTIVITIES | INSTINCTS (Synonyms in Parentheses) |
|--|---|
| Fear (terror, fright alarm trepidation) | Instinct of escape (of self preservation of avoidance danger instinct) |
| 2 Anger (rage fury annoyance irritation displeasure) | Instinct of combat (aggression pug nacity) |
| 3 Disgust (nausea loathing repugnance) | Repulsion (repugnance) |
| 4 Tender emotion (love tenderness ten der feeling) | Parental (protective) |
| 5 Distress (feeling of helplessness) | Appeal |
| 6 Lust (sexual emotion or excitement sometimes called love—an unfortunate and confusing usage) | Pairing (mating reproduction sexual) |
| 7 Curiosity (feeling of mystery of strange ness of the unknown wonder) | Curiosity (inquiry discovery investi gation) |
| 8 Feeling of subjection (of inferiority of devotion of humility of attachment of submission negative self feeling) | Submission (self abasement) |
| 9 Elation (feeling of superiority of master fulness of pride of domination positive self feeling) | Assertion (self-display) |
| 10 Feeling of loneliness of isolation nos talgia | Social or gregarious instinct |
| 11 Appetite or craving in narrower sense (gusto) | Food seeking (hunting) |
| 12 Feeling of ownership of possession pro tective feeling | Acquisition (hoarding instinct) |
| 13 Feeling of creativeness of making of productivity | Construction |
| 14 Amusement (jollity carelessness re laxation) | Laughter |

The physiologic participations have been and still are the object of almost feverish search in the hope of gaining definition of emotional states in conditions largely clinical, wherein introspective accounts and general behavior give meager or paradoxical results.

Kanner's study of the matter with the first year medical students at the Johns Hopkins University may be cited to illustrate the method and results.

He presented them with the Feleký photographs posed to represent certain emotions and analyzed the returns from each. Grading each interpretation from 10 (highest) to 0 (lowest) and considering grades of 7 to 10 as satisfactory he found the order of recognizability of the photographs from highest to lowest to be Surprise fear breathless interest contempt horror determination disgust sneer hate interest justified anger (Figs 15 to 17). He noted further a dispersion of terms indicating the emotions the degree of the dispersion depending on the emotion (see Table I).

The scattering quotient of the table is the number of names offered as best terms for each picture divided by the number of the returns. Table I shows that horror and fear were interpreted with the least scattering quotient and shame with the highest. Table II showing the distribution of scores among the students indicates the women to be slightly more capable of judging emotions from the posed photographs. Table III shows the percentage of photographs identified by individual students. Table IV shows contrasting scores high and low given to indicate the great variation in the ability to judge emotions and to imagine a suitable situation or utterance for the emotion. He found little correlation between the performance score on this test and intelligence rating (see Table V).

Landis on the basis of experimental data questioned the existence of patterns of expression. He had 25 subjects take part individually in a standardized series of situations calculated to produce emotional activity. The principal facial muscle groups of the subjects were emphasized by black lines on the surfaces controlled by them thus making them more easily accounted for in the photographs which were taken of the subjects in these situations. He reports no evidence of an expression typical of any situation in his experiment but rather a tendency for each individual to use certain muscles or groups of muscles in the majority of expressive reactions to the exclusion of other muscle groups. He also indicates an absence of definite facial patterns corresponding to the verbal reports of the emotional experiences of his subjects. By way of explaining the reports of other experimenters that certain patterns of expression are generally recognized by subjects Landis suggests that the pictures used in such studies are not true portraits of the faces of emotion but are rather pictures of the socialized and to a large extent conventionalized reactions which are used as supplementary language mechanisms. In a later discussion however Landis suggests that there are some innate expressions of emotion but that their recognition is acquired.

TABLE I*

FIRST AND SECOND LEADING TERMS, SCATTERING QUOTIENTS, AND "NO REPLIES"

| EMOTION | FIRST LEADING TERM % | | SECOND LEADING TERM % | | SCATTERING QUOTIENT | NO REPLIES % |
|---------------------|----------------------|----------------------|-----------------------|-----------------------|---------------------|--------------|
| | Present study Feleky | | Present study Feleky | | | |
| Fear | Fear (31) | Terror (14) | Horror (17) | Fright (12) | 0.12 | 2.0 |
| | Anger (18) | Ughness (13) | Hate (7) | Disgust (11) | | |
| Hate | Sorrow (14) | Worry (10) | Pity (13) | Anxiety (9) | 0.30 | 0.7 |
| | Anxiety (10) | Despair (11) | Despair (10) | Distraction (9) | | |
| Sympathy | Anger (24) | Horror (16) | Rage (16) | Rage (9) | 0.21 | 0.6 |
| | Disgust (49) | Disgust (36) | Scorn (4) | Repugnance (14) | | |
| Despair | Contempt (10) | Sneer (33) | Scorn (9) | Contempt (19) | 0.15 | 0.75 |
| | Disdain (16) | Contempt (21) | Scorn (16) | Scorn (11) | | |
| Rage | Coyness (17) | Modesty (22) | Coquetry (9) | Coyness (10) | 0.35 | 9.5 |
| | Surprise (54) | Surprise (30) | Wonder (5) | Wonder (14) | | |
| Disgust | Pleasure (17) | Interest (22) | Interest (9) | Expectancy (19) | 0.41 | 12.0 |
| | Fear (19) | Fear (17) | Suspicion (17) | Dread (9) | | |
| Sneer | Surprise (62) | Surprise (52) | Astonishment (9) | Wonder (12) | 0.53 | 3.9 |
| | Pleading (7.5) | Tenderness (18) | Pleasure (6) | Sympathy (14) | | |
| Shame | Anger (24) | Determination (23) | Determination (23) | Firmness (8) | 0.18 | 4.5 |
| | Puzzlement (8) | Anger (9) | Anger (6) | Worry (8) | | |
| Breathless Interest | Horror (23) | Horror (32) | Fear (19) | Terror (13) | 0.32 | 3.8 |
| | Headache (34) | Phys. suffering (25) | Pain (11) | Mental Suffering (16) | | |
| Interest | | | | | 0.29 | 5.7 |
| | | | | | | |
| Suspicion | | | | | 0.22 | 1.3 |
| | | | | | | |
| Surprise | | | | | 0.51 | 6.2 |
| | | | | | | |
| Pity | | | | | 0.30 | 0 |
| | | | | | | |
| Determination | | | | | 0.26 | 5.7 |
| | | | | | | |
| Anger | | | | | 0.11 | 1.5 |
| | | | | | | |
| Horror | | | | | 0.15 | 1.5 |
| | | | | | | |
| Physical Suffering | | | | | | |
| | | | | | | |

* From Kanner

Frois Wittman used for experimental purposes approximately 50 photographs of expressions posed by himself which he supplemented with a like number of sketches showing the various involvements of facial musculature

Jenness holds that the inverse relationship between original ability and amount of gain or loss should not be attributed to the effect of train

TABLE II*
DISTRIBUTION OF SCORES AMONG THE SUBJECTS

| SCORE | MEN | | WOMEN | | BOTH SEXES | |
|----------|--------|-------|--------|-------|------------|-------|
| | Number | % | Number | % | Number | % |
| Above 80 | 3 | 0.8 | 0 | 0.0 | 3 | 0.7 |
| 71-80 | 43 | 11.8 | 4 | 9.0 | 47 | 11.5 |
| 61-70 | 90 | 24.7 | 12 | 26.7 | 102 | 25.0 |
| 51-60 | 120 | 33.0 | 19 | 42.1 | 139 | 34.0 |
| 41-50 | 81 | 22.5 | 10 | 22.2 | 92 | 22.5 |
| 31-40 | 20 | 5.5 | 0 | 0.0 | 20 | 4.8 |
| 21-30 | 6 | 1.7 | 0 | 0.0 | 6 | 1.5 |
| Total | 364 | 100.0 | 45 | 100.0 | 409 | 100.0 |

* From Kanner

TABLE III*
SHOWING THE PERCENTAGE OF PHOTOGRAPHS IDENTIFIED BY
THE INDIVIDUAL OBSERVERS

| PER CENT OF IDENTIFIED PICTURES | NUMBER OF STUDENTS |
|---------------------------------|--------------------|
| 0 | 1 |
| 1-10 | 4 |
| 11-20 | 14 |
| 21-30 | 36 |
| 31-40 | 64 |
| 41-50 | 133 |
| 51-60 | 72 |
| 61-70 | 60 |
| 71-80 | 20 |
| 81-90 | 5 |
| 91-100 | 0 |
| | Total 409 |

* From Kanner

TABLE IV*

A

| PHOTOGRAPH POSED FOR | BEST TERM | SITUATION AND UTTERANCE | SCORE |
|--|------------------------------|--|-------|
| Fear | Fear and element of surprise | Finding a murdered person | 10 |
| Disgust | Disgust Revulsion of feeling | Seeing decayed body "Ugh!" | 10 |
| Physical suffering | Pain | Headache "O, my head" | 10 |
| Despair ("What shall I do now?") | Despair | Death of husband or child "What shall I do?" | 10 |
| Determination | Determination | Asked for the hand of her daughter "I will not!" | 10 |
| Suspicion ("accompanied by fear"—Feleky) | Fear and indecision | Hears a sound when alone "What was that noise?" | 7 |
| Rage | Indignation | Has been slapped on the face "You—you—" | 8 |
| Horror | Fear | Sight of a ghost Scream | 9 |
| Hate | Contempt | Toward a man who doublecrossed her "You cur!" | 7 |
| Sneer | Self-consciousness | Has been given a compliment "You flatterer!" | 2 |
| Total score | | | 83 |

B

| PHOTOGRAPH POSED FOR | BEST TERM | SITUATION | SCORE |
|----------------------|------------|-----------------------|-------|
| Despair | Worry | Failure | 4 |
| Physical suffering | Disgust | Displeasing situation | 2 |
| Rage | Horror | Quick fear | 3 |
| Horror | Anger | | 3 |
| Disgust | Worry | Inside the mind | 1 |
| Hate | Depression | Mental agony | 1 |
| Fear | | | 0 |
| Interest | Sorrow | | 1 |
| Righteous anger | Depression | | 1 |
| Suspicion | Fear | | 6 |
| Breathless interest | Horror | | 1 |
| Sympathy | Sad | | 4 |
| Total score | | | 27 |

* From Kanner

TABLE V*

CORRELATION BETWEEN JUDGMENT OF FACIAL EXPRESSION
AND RESULTS OF THE THORNDIKE INTELLIGENCE TEST

| JUDGMENT OF FACIAL EXPRES- SION | INTELLIGENCE RATING | | | | | | | | | | TOTAL |
|--|---------------------|-------|-------|-------|--------|---------|---------|---------|---------|---------|-------|
| | 51-60 | 61-70 | 71-80 | 81-90 | 91-100 | 101-110 | 111-120 | 121-130 | 131-140 | 141-150 | |
| 21-25 | | | | | | 1 | 1 | | | | 2 |
| 26-30 | | | | | 1 | | | | | | 1 |
| 31-35 | | | 1 | | | 1 | 1 | | | | 3 |
| 36-40 | 1 | | 1 | | 2 | 2 | 2 | 2 | | | 10 |
| 41-45 | | | 1 | 1 | 4 | 4 | 4 | 4 | 1 | 1 | 20 |
| 46-50 | | | | 1 | 9 | 4 | 1 | 7 | 3 | 1 | 26 |
| 51-55 | | | | 2 | 3 | 5 | 5 | 11 | 1 | | 27 |
| 56-60 | | | 2 | 2 | 1 | 8 | 11 | 9 | 7 | | 40 |
| 61-65 | | 1 | | 2 | 1 | 5 | 3 | 3 | 2 | 1 | 18 |
| 66-70 | | | 1 | | 1 | 8 | 8 | 3 | 5 | | 26 |
| 71-75 | | | | | 4 | 1 | 4 | 8 | 4 | | 21 |
| 76-80 | | | | | | | 2 | 1 | | | 3 |
| 81-85 | | | | | | | 1 | | | | 1 |
| TOTAL | 1 | 1 | 6 | 8 | 26 | 39 | 43 | 48 | 23 | 3 | 198 |

* From Kanner

ing. He found when the reliability of the facial-expression test, found by retesting a group of subjects, was taken into account, the negative coefficient practically disappeared. He concluded from his study that one might at first decide that the chances of arriving at a satisfactory solution of any major problem in this field are extremely slight. He felt, however, that these beginnings, rather than being fruitless, pointed to the necessity for new and better technics of research and for more thorough consideration of the fundamental problems involved.

Watson, in 1920, concluded from his careful studies of infant behavior that there were three unlearned or inherited emotional reaction patterns, which with their stimulating situations are as follows: (1) Fear, caused by loss of support, shown by crying (Fig. 18), (2) love, aroused by stroking and petting, and shown by smiling, gurgling and cooing, and (3) rage, brought about by the restraining of bodily activities and demonstrated by the stiffening of the body, random movements, or screaming.

The first facial expressions of the child are those of desire and refusal. They are shown especially in the eyes, due to the fact that when some



Fig 15—Surprise



Fig. 16—Horror



Fig. 17—Disgust.

thing is desired the eyes are opened to a great extent and when the child wishes to refuse the eyes are closed tightly. Refusal and desire are also shown in the action of the mouth by smacking the lips when desiring and pouting when refusing. Refusal alone is shown by wrinkling up of the nose. During the growth of the child other features are developing such as imagination and being attracted by some object. After reaching an



Fig. 18—The Weeping Infant of M. A. Jacobs (Dr. R. Tait McKenzie
Int. Clinics 4:282, 1932)

older age the child develops the will power to accept or to refuse which also may be noticed by the features and expressions on the child's face. On reaching puberty the male child develops the predominating features of a man which are readily seen in the face showing both energy and strength. In the female adult the features are predominated by emotions and affect.

Sherman however in 1929 showed that without some knowledge of the stimulus or environmental situation adults could not differentiate these three emotional reactions. Watson further demonstrated that emo-

ional reactions may become associated with objects previously lacking such emotional association giving rise to learned or conditioned responses as in the case of Watson's 11 month-old experimental subject in whom a loud noise and loss of support produced a reaction of fear. A white rat was then presented simultaneously with the loud sound a number of times and later the rat was sufficient in itself to evoke a fear response.



Fig. 19—Fear response in animal. Expression of a cat frightened by a dog (Redrawn from Darwin)

Thalbitzer in 1906 stated that feelings are distinguished from moods principally by their greater intensity and emotions are distinguished by their sudden appearance, their considerable intensity, their comparatively short duration and rapid cessation. For instance, the inhibited man lies or sits quietly, looking roguish and seemingly happy; his feelings are much exalted while there is a decided inhibition of all movement. If motor inhibition is extended also to the muscles of the face, the strong feeling of pleasure may no longer appear in his features or it most as a

sort of cunning but as soon as we busy ourselves with the patient and are fortunate enough to overcome this inhibition his mood betrays itself very soon in a beaming smile

Wundt thought that emotions could be grouped about three pairs of opposed reactions (a) Tension—relief (b) pleasure—displeasure (c) excitement—calm The mouth according to Wundt is extremely important in the expression of emotion because the various taste qualities are



Fig. 20a—Combat emotion. Illustration of swan driving away intruder (Redrawn from Darwin)

correlated with pleasantness and unpleasantness and hence with acceptance and rejection

Many theories have been advanced to explain emotional states. The so called James Lange theory, one of the first, was independently arrived at by James of the United States in 1884 and Lange of Denmark in 1885. It postulates that emotion is organic awareness of reaction to the original stimulus. The order of activity is as follows: (a) Emotional exciting situation, (b) physiologic reaction, and (c) emotion or awareness of physiologic changes. To use a classical example, seeing a bear would cause one to run because of fear. That would be termed emotional awareness. In other words, we run not because we are afraid, but we

are afraid because we run. The artificial separation of the emotion as mental and the behavior as physical is an outgrowth of the Mind Body School of Philosophy.

McDougall, in 1908 believed that emotion as a conscious state and instinct as an inherited reaction were two aspects of the same activity and he tabulated some 14 instinct emotion combinations as for example the instinct to combat the anger emotion and so on (Figs 20a and 20b)

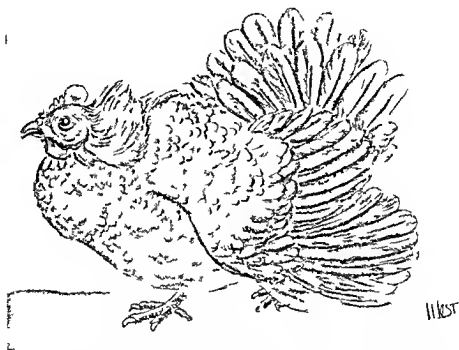


Fig 20b—Combat emotion. Illustration of hen driving away intruder from her chicks (Redrawn from Darwin)

Bird discussed the work of a number of investigators as to the source within the central nervous system of a remarkable group of activities which follow decortication in the cat. He states that they have established the fact that the decorticate cat or dog in the chronic as well as in the acute condition is capable of displaying a type of behavior which is commonly regarded as expressive of anger. The quasiemotional behavior consists of both somatic and visceral activities and the latter are plainly due to a discharge of sympathetic impulses. This behavior simulates the expression of anger as seen in the normal cat and is best described as a sham rage.



Fig 21a—Anger Illustration of a snarling dog
(Redrawn from Darwin.)



Fig 21b—Photograph of a grey Persian cat showing anger. Usually this animal is mild mannered but it resented being placed on the table in front of two powerful lights while being photographed. The animal suddenly became unfriendly. All persuasive methods failed to induce the cat to be photographed. One of the bystanders growled at the animal and the shutter was released at the moment when the facial expression of the cat displayed anger and combativeness (Courtesy of Mr J N Unwalla FRPS, Bombay India)



Fig. 22—Kitten seven weeks old pained by squeezing. Showing dilated pupils, distressed facies, defensive teeth mechanism.



Fig. 23—Expression of intent concentration and alertness in Siamese cats. (Courtesy of Mr. Edwin Broomer, F.R.P.S., F.R.S.A.)

Cannon in 1927, as a result of his physiologic investigations came to the conclusion that the thalamus or the end station of all forms of sensation was the center of emotion and when stimulated caused emotional activity in all its various aspects awareness as well as explicit and implicit reactions. Descartes it will be recalled regarded the pineal gland as the seat of the soul. Cannon however showed that as genetically older portions of the brain were resected starting with the forebrain no demonstrable change in the emotional behavior of animals was produced until the thalamus was removed following which all emotional responses ceased. Recently it has been predicted that adrenalin may be responsible for the visceral sensations or stirred up feeling of emotion but its injection in human subjects does not produce any real emotion unless it is supplied by appropriate suggestion. Psychologic experiments moreover, seem to indicate that emotion may precede the visceral changes and does not necessarily parallel or accompany them. While many of these theories may explain some aspects of emotional activity none of them seems to account fully for all of the observed conditions.

In genuine emotional states the various facial muscles act in unison involuntarily producing expressions we regard as perfectly natural. Grinaces on the other hand result when dissociated muscle groups are brought into action voluntarily and appear artificial. Of interest is the correlation existing between the anatomic basis of expression and the psychic state, i. e. the anatomic location and innervation of the facial muscles determine which emotions can occur together. Thus during attention the frontal muscle wrinkles the skin of the forehead transversely and elevates the eyebrow while in meditation the eyebrow is drawn downward hence it is plainly impossible for one to be in a state of attention and of meditation at the same time. Similarly in joy the zygomatic muscles elevate the angles of the mouth which are depressed in grief or sorrow (Figs. 24 to 26).

As noted the most expressive regions of the face are the areas about the eyes and mouth but the eyes alone quite apart from the rest of the face are infinitely expressive conveying much inner meaning. They are truly the windows of the soul. The intangible and fleeting character of their expression makes discussion difficult description impossible and classification or cataloging futile but everyone recognizes the vacant glassy stare the cold aloof gaze the faraway look and that certain meaning glint in the eyes. The nasolabial furrow present in practically all faces except those of the very aged or those with facial paralysis is an oblique line extending downward and outward from the wing of the nose



Fig 24—Attention.



Fig 25—Meditation



Fig. 26—Res gnat on

to a point just beyond the commissure of the mouth. Normally straight or smoothly curved it is subject to changes in shape with emotional expression (Figs 27a and 27b). In laughter it is in the form of a double



Fig. 27a—Michelangelo's David in Florence Italy. Upper dotted line Procerus Fold (Gladiator Fold). Lower dotted line Nasolabial Fold caused by levator anguli oris (line of dissatisfaction). (From Lange.)

S resembling an old italic S. In grief it becomes curved with the convexity outward. In pain it is stiffly straight while in contempt it is drawn in slightly at its lower end extending about the angle of the mouth.

Complete relaxation of expression signifies inactivity of the mind while tenseness of the facial muscles exhibits an alert mind. Certain irritations such as trouble or sorrow produce a slow and steady change

in facial expressions. Repeated temporary irritation may produce characteristic traces seen in the face. The muscles that are most active become the dominating ones and produce wrinkling of the skin of the face. These will show the past experiences and hardships of the individual, which the



Fig. 27b—Lateral fold line: oral median line: mentolabial fold. (Action of quadratus labii inferioris + mentalis + triangulus.) (From Lange.)

photographer very often removes. As an example of this theory, an old couple resemble each other in facial expressions because of their life together. This facial wrinkling must be differentiated from the characteristic wrinkling of the skin due to the loss of tonicity. In the face of the congenital blind person, the frontal eyebrow and the ring muscles of the eyes are lifeless, and, in acquired blindness, they are less lifeless. In

deafness the motion of the oral muscles is increased and the eyes are keener

The different expressions are easily recorded in photographs of an insane person because of the loss of his inhibitions. In the weak minded



Fig. 28a—Mask of Violent Effort. (Dr R. Tait McKenzie
Int. Clin. cs. 4:282, 1932.)

person special changes are seen such as an open mouth, very often horizontal lines on the forehead and a peculiar stare. Diseases of the body may produce facial changes. In cases of paralysis of the facial nerves the features appear lifeless. Obstructions in the respiratory organs such as stenosis of the larynx produce an open mouth and a stupid expression even though the person may be intelligent.

Mckenzie in 1932 studied the facial expression of the emotions with special reference to violent effort and fatigue (Figs 28a and 28b). He examined the face of the sprinter, jumper and hammer thrower in whom the breath has been caught and held until the end of the effort. After

the 100 yard dash the face of the runner reveals a general converging of the lines to the root of the nose with transverse wrinkles over the bridge. The frowning brows are drawn down and the eye is narrowed to a mere slit as in laughing and crying. The hammer thrower or the



Fig. 286—Violent effort as seen in the broad jumper whose eyes are tightly shut. Note the act on of the levators of the upper lip and the platysma in strong act on retracting both lips from the clenched teeth. (Dr R. Tait McKenzie, *Int. Clin.* 4: 282, 1932.)

jumper often does close his eyes at the moment of greatest effort and the sprinter would do so if he did not have to keep his course. The nose and upper lip have a snarling expression, the nostrils are distended and the lower lip drawn tightly across the clenched teeth except at the angles of the mouth where there are little pouches caused by the pulling of the platysma which stands out on the necklike cords. In this state



Fig. 29—Rage. Original drawing by Sir Charles Bell in his 'Anatomy of Expression' showing the wrinkled nose, frowning brow, and snarling nose and mouth, which rage shares with violent effort. The open and staring eyes distinguishes the expression from that produced by effort.



Fig. 30—Fury. 'La Marseillaise' by Rude. From the group in the Arc de Triomphe, Paris, showing the frowning brow and snarling nose of effort, but with the open, shouting mouth.

there is a rapid rise of the blood pressure which effort shares with both laughter and tears

Respiration plays its part in the weeping infant who gasps for breath the air is expelled until the lungs seem to be empty when it is taken in by short gasps The eyes are tightly closed the mouth open Jacobs has shown this in his head of the crying child with its swollen lids down



Fig 31a—Mask of Breathlessness (Dr R Tait McKenzie
Int Clin cs 4 282 1932)

drawn open mouth and wrinkled nose (see Fig 18) When the crying fit is over the redness of the face pales as the blood pressure goes down and the breathing gradually returns to normal

Sir Charles Bell's drawing of rage shows the wrinkled nose frowning brow and snarling nose and mouth The expression differs from that of violent effort in that the eyes are open and staring (Fig 29)

Fury is depicted by Rude in his Marseillaise group on the Arc de Triomphe which is shown in the furious helmeted figure with upraised



Fig. 31b—Breathlessness. As seen in an athlete at the finish of the half mile race. Note the raised oblique eyebrows, the lowered eyelids, the open mouth, and the retracted lips. (Dr. R. Taft McKenzie, *Int. Clin.* 4:282, 1932.)



Fig 32a—Mask of Exhaustion (Dr R Tait McKenzie
Int Clinics, 4 282, 1932)



Fig 32b—Mask of Fatigue (Dr R Tait McKenzie,
Int Clinics, 4 282 1932)



Fig. 32c.—Breathlessness and fatigue. As seen in the winner of the marathon race at the Olympic Games. Photograph taken just after he crossed the finish line. Note the pain in the oblique eyebrows, the drooping of the eyelids and the retracting lips of breathlessness and fatigue. (Dr. R. Tait McKenzie, *Lancet* 4: 282, 1932.)

sword urging the soldiers, young and old to water the furrows of their land with the blood of her enemies (Fig 30)

Fear and anxiety may be best shown in the face of the patient whose heart is laboring to keep up with its vital work or whose lungs are barely able to keep from suffocating the spark of life, as in double pneumonia



Fig 32d—Exhaustion and fatigue at the end of a mile race. The leader shows the loose open mouth of exhaustion with the head thrown back and the eyebrows raised to see his course because the eyes are almost closed. The second runner shows the slight frown and drooping eyelids and loose cheek and mouth of fatigue. (Dr R Tait McKenzie Int Clinics 4,282 1932)

The muscle of pain draws the brows into the obliquity of pain and sorrow the eyes are half closed the corners of the mouth are drawn down and the upper lip slightly raised as the nostrils dilate for the intake of each breath. The patient is in dread of suffocation. Fear is in his heart and on his face.



Fig. 33a.—Preterminal faces (death agony). Woman 112 years of age
Ten minutes before death

In the mask of breathlessness (Figs 31a and 31b) the general direction of the eyebrows is just the reverse of that seen in violent effort. They are drawn upward and inward by the *corrugator* as seen in all mental distress, grief or bodily pain. The upper lids droop and half cover the eyeball giving a look of great lassitude to the suffering expressed in this region. The general poise of the head is back and the chin is thrust forward and the neck is strained.



Fig. 33b—Preterminal faces (death agony) Woman 112 years of age
Forty seconds before death

In the mask of fatigue (Figs 32a 32b 32c and 32d) a slight frown replaces the acute pain shown by the eyebrows. The eyelids seem heavy with sleep. The upper lip is still slightly retracted and the mouth opens as the jaw drops. The cheeks are relaxed and flaccid and the whole face assumes a drunken and stupid expression. It is the face of intoxication.

McKenzie states that the expression of the face in natural death is always a blank and the features settle into their habitual positions of



Fig 34—Expressions of emotion (Rudolph)

relaxation. The smile in death is the habitual smile that was characteristic during life.

A detailed description of the endless changes in facial expression in the various emotional and physical states would be as intriguing as perusing a blueprint of the Grand Canyon for these matters may best be represented pictorially. The most exhaustive presentation by far on this particular subject in any language is Heinrich Rudolph's atlas on the *Expression of Emotion in Man*. In it are some 700 superb pen drawings depicting the entire gamut of human emotions (Fig 34).

Whether or not character is reflected in the face is a question that has ever charmed the intellect of man. At every period of human existence pseudosciences of characterology or systems of character analysis have flourished, based on the premise that one's character as well as destiny could be prognosticated by the mold of one's features. Facial expression however, is much more important as an index of character than are the features because the latter are permanent and not subject to voluntary control. Habitual expressions moreover become fixed in the course of time and kindness aggressiveness avarice and determination all leave their mark. If this were not the case would not the efforts of the artist be in vain when he strives to capture on his canvas the consuming ambitions and driving motivations of his subject? It is fascinating to speculate whether the deliberate assumption of a certain expression will result in the generation of the corresponding characteristic or character trait as is claimed by the so called character rebuilding schools.

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CHAPTER VI

RACIAL TYPES

AT THE OUTSET, it would be well to point out that *pure racial types* as such are considered by most anthropologists not to exist, chiefly because of the effects of *interbreeding*. In the strict sense in which the term "race" is employed, it does not refer to nationalities, castes, or language groups, but rather to a group of people of common ancestry who have certain physical characteristics in common that serve to distinguish them from all others. A race, therefore, represents a composite or average of an immense number of samples of individuals. Because of the extensive overlapping of characteristics, clear-cut, sharply defined types are difficult to find. The breakdown of the isolation of biologic groups by migration from within and invasion from without has led to much intermixture of blood. *Inbreeding* gives rise to uniformity and stability of type, *outbreeding* leads to variability, provided the divergence of parents is not too great. All races are, however, fertile with each other as is not true of totally distinct species.

The origin of the races is still largely an unsolved problem although the differentiation probably started in Pliolithic times because as already noted, the *Grimaldi* race possessed certain Negroid features in contrast to the Asiatic appearance of Cro Magnon man. The fundamental evolutionary processes of natural variation and natural selection, working hand in hand with the secondary factors of isolation, adaptation and hybridization, were, no doubt, responsible in large measure for the formation of the races.

Mankind, like Caesar's Gaul, is divided into three grand divisions or primary stocks, according to practically all modern physical anthropologists. This simple but useful classification, suggested by Linnaeus rests on the most obvious of traits, namely, difference of skin color. Since the pigment is in all cases the same, the difference as a consequence is basically a quantitative one, and a complete sequence of transitional shades exists. There are, accordingly, the white, black, and yellow races, or the *Caucasoid*, *Negroid* and *Mongoloid* races, which comprise approximately 99 per cent of all human beings. These, of course, leave out certain aberrant forms difficult to classify, such as the *Ainu* of Japan, the aboriginal *Australians*, and the *Polynesians*, who represent mixed or blended types. It is well to remember, however, that the criterion of skin color is of only limited differential value, as there are subvarieties of *Caucasians* that are darker than millions of *Mongolians*. The *Hamites* of the Red Sea Province

of Sudan are examples of so called dark allophylian Caucasians. The degree of cutaneous pigmentation represents an adaptive characteristic and is dependent upon geographic and climatic conditions. In the tropics the dark skin acts as a protection against the intense solar heat which it reflects. On the other hand in cold moist or cloudy regions a light skin is almost essential in order that the maximum benefits may be secured from the health giving tonic rays.

A brief consideration at this point of a few fundamental anthropometric determinations and physical traits upon which racial classifications depend will not be amiss. The usual measurements made may be listed as follows:

1 Stature or bodily height of little classificatory value because of the great overlapping of the races in this respect.

2 Head length measured with a sliding caliper from the glabella or midline frontal prominence above the root of the nose to the most distant point on the occiput.

3 Head breadth or maximum transverse dimension wherever it occurs.

4 Face breadth between the most outstanding points of both zygomatic arches.

5 Face height from the trasion or gnathion or from the point where the nasal bridge joins the forehead or frontal bone to the lower chin border.

6 Nasal height from the trasion to the nasal spine where the septum joins the upper lip.

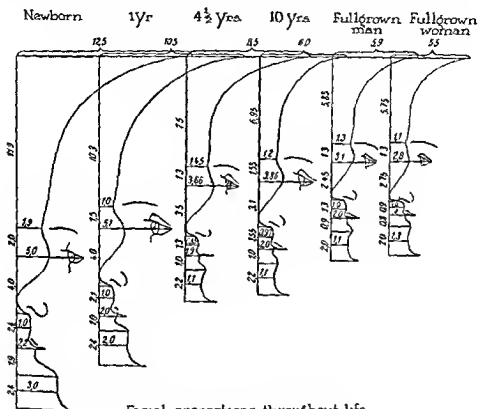
7 Nasal width or maximum width of the nose.

It is evident that almost all of these measurements are restricted to the skull. This is as it should be since the skull at birth is closer to its final size than any other part of the skeleton attains its maximum growth at a much earlier age and more clearly displays hereditary traits than do more slowly growing parts which would therefore be more susceptible to modification by external influences (Fig. 1). Alphonse Bertillon (1853-1914) the French anthropologist made extensive use of these anthropometric determinations in addition to the scars, eye color and fingerprints for the identification of criminals. Cranial capacity or skull volume is chiefly of academic interest and does not afford a reliable means anyway for racial differentiation. It is only in a very general way correlated with intelligence. The average for males the world over is around 1450 cc. being 10 per cent less for females. It is dependent to a large degree on bodily size although Alpine Europeans exceed the Nordics in cranial capacity despite their smaller average stature.

From these primary measurements are derived secondary indices or proportions

1 Cephalic index Obtained by dividing the width by the length of the head the result being expressed in the form of per cent

2 Transverse cephalofacial index The width of the face being divided by the width of the head



Facial proportions throughout life
Hakenberg *Der Gesichtsausdruck des Menschen*

Fig 1

3 Anatomic facial index Obtained by dividing the facial height by its width

4 Nasal index The width of the nose divided by its height

Any one of these measurements in and of itself is probably of little significance but the calculation taken as a whole is useful in separating the racial types The cephalic index is most popular because it can be easily and accurately determined not only on the living but on the skull of the corpse as well According to these measurements three types of heads are distinguished (a) Brachycephalic—the broad or round head with the index above 80 (b) mesocephalic—the medium

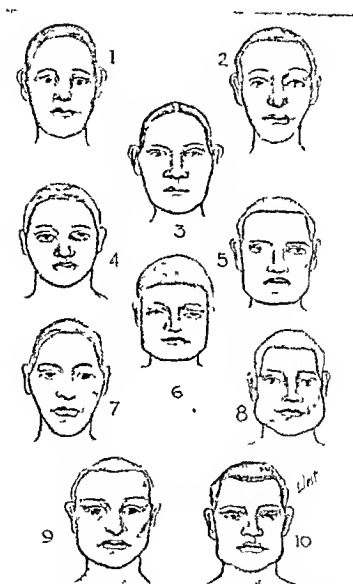


Fig. 2—Forms of faces in frontal view 1, Elliptical, 2, oval, 3, obverse oval
4, round, 5, angular, 6, quadrangular, 7, rhomboid & trapezoid, 8 obverse trapezoid,
9 quantangular

head between 75 and 80 (c) dolichocephalic—the narrow or long head below 75

The values for the cephalic index are not sufficient to differentiate the primary races because of overlapping and lack of uniformity. Thus there may be broad medium or narrow headed Caucasians. The determination is of some value however in distinguishing the subtypes (Fig 2)

Generally speaking all Negroid peoples with the exception of the brachycephalic pygmies tend to be dolichocephalic as do the Caucasians

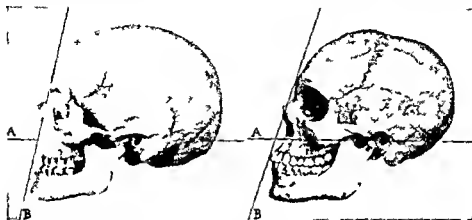


Fig 3—Racial types. Left lines showing facial angle Caucasian or white race Right lines showing facial angle Negro or mixed races (Broomell *Anatomy and Histology of Mouth and Teeth*)

in the main excepting the brachycephalic Alpines. The Caucasoid skull is high vaulted however in contrast to the low Negro skull. Most Mongolians are either brachycephalic or mesocephalic. All anthropoid apes have brachycephalic skulls whereas fossil or primitive man was dolichocephalic. From this standpoint the narrow headed Negro would appear most primitive although if compared with the ape which is broad headed he would represent a more specialized form. It is such discrepancies as these that render an evolutionary rating of the races impossible since primitive traits may coexist with highly specialized traits. Thus the primitive development of the supraorbital ridges and the prognathism of the Negro exist side by side with the more highly specialized features that are most removed from the apes namely the glabrous or smooth relatively hairless skin the curly hair and the thick lips.

With the nasal index also three types are recognized (a) Platyrrhine or broad nose when the index is above 85 most Negroids fall into this category (b) mesorrhine or medium nose between 70 and 85 as occurs in the Mongoloids (c) leptorrhine or narrow nose as is typical for the Caucasians (Fig 3)

This determination too is of limited applicability because it gives no information about the prominence or external configuration of the nose because the index varies with age and because it can be determined only on the living.

The nose however is not only a prominent facial feature but is a most important one as well in the differentiation of the racial types. Especially significant is the degree of development of the root of the nose. The two small roughly quadrilateral nasal bones unite with each other and articulate with the frontal bone at the nasion to form the bridge of the nose. In childhood the nasal bones join each other at an oblique angle producing a low or flat type of nose. The bones develop with age and in the Caucasians the angle finally becomes acute giving rise to the typical high prominent nose with a narrow bridge. In Negroids the bridge of the nose remains in a flat or infantile stage. In the Mongoloids an intermediate condition prevails. The absence of a depression between the nose and forehead together with the poorly developed supraorbital ridges gives a very characteristic flatness to the face that is almost more distinctive than the Mongolian eyes. The so-called Semitic nose is in reality a misnomer since it is lacking in many of the purest Semites. It is on the other hand characteristic of the ancient Hittites and the modern Armenians and should more appropriately be designated as an Armenoid nose.

Another important anatomic landmark is the nasal spine which is situated in the midline in the lower margin of the pyriform or nasal aperture and which forms a bony support for the cartilage of the nasal septum. This structure is flattened or even absent in the Negro small or rounded in the Mongoloid and broad or sharply pointed in the Caucasian.

The supraorbital or superciliary ridges represent the lower margin of the frontal bone and the upper boundary of the orbits. This formed as has been mentioned previously a most conspicuous feature of the skulls of fossil man notably the Java ape-man and the Rhodesian man as well as the anthropoid apes. Except for certain American Indians it is but slightly developed in the Mongoloid is strongly marked in the Negro and moderately so in the Caucasian. The development is greatest in the male appearing around the age of 14 and is frequently lacking in the female.

Still another somewhat important bony prominence is the glabella which is situated between the supraorbital ridges in the midline and is the most forward projecting point on the frontal bone. It is usually

poorly developed in females but attains a fair degree of prominence in the males of the Caucasoids some American Indians Australians and Papuans. It is not particularly evident in the Mongolian or African Negro.



Fig. 4a—Prognathism

The facial width measured from the most outstanding points of the zygomatic arch was rather great in the primitive Cro-Magnon man making the face appear disproportionately large. The modern Eskimos and northern Mongolians have high cheeks due to the prominent forward projecting malar or cheekbones which give a broad flat appearance to the face.

The gnathion or mental point is the most forward point in the mid line on the chin. A prominent chin, despite popular misconceptions, does not denote a superabundance of courage and determination, but from the evolutionary standpoint appears related to diminution in dentition. It simply denotes a "weak chewer," generally speaking, having a superior chin development. It will be recalled that in the evolution of man, this



Fig. 1b—Roentgenogram of face of patient in Fig. 4a.

feature was a relatively recent acquisition. The Caucasian chin, as a rule, is considerably more prominent than that of either the Mongolian or Negro.

Prognathism (Figs 4a and 4b), or the degree of projection of the lower jaw, represents a rather conspicuous facial characteristic and is typical of all mammals in general, including the anthropoid apes as well as primitive man. It occurs almost universally among Negroes, moderately so among Mongolians, and to a very slight extent, if at all, among the Caucasians.

The contour and thickness of the lips constitute an interesting and important physical trait. The full vivid red thick lips of the Negro are most removed from the thin greyish human lips. The Caucasian lips although thin have a more complex bow on the upper rim. The Mongoloid lips fall somewhere between these two groups and approach the Caucasoid more closely in type.

The yellow brown race has the largest ears which tend to be oval with a long dangling lobule. The Caucasians have narrower longer but somewhat smaller ears with shorter lobules. The Negro's ear is the smallest. It is occasionally of angular contour, has no lobule, and the helix or incurved exterior rim is often rather irregular.

The epicanthic or Mongolian fold, especially typical of the Asiatic Mongol, is a most important ethnic characteristic. This small triangular fold of skin rises several millimeters above the free eye-lash-bearing margin on the inner side of the upper lid, sweeps medially over the inner canthus or angle of the eye which it partly overhangs and merges with the skin of the nose making the eye appear oblique or slanting. The palpebral fissure or eyeslit is narrowed and may indeed be obliquely placed. The Mongolian fold may occur on one or both sides. Not all Mongolians have it even though their eyes may be slanting. Occasionally it occurs in Negro children, disappearing as the nose develops and rarely it is seen in Caucasians, for instance in persons with mongolism or mongolian idiocy (whence the condition derives its name). The position and relations of the orbits in the skull of Mongolians are essentially the same as in other races.

Tremendously valuable as a criterion for racial differentiation is the structure of the hair. In fact Joseph Deniker (1852-1919), the French ethnographer, devised an elaborate racial classification based almost exclusively on the form and texture of the hair alone. He recognized six major and 17 minor divisions and 99 distinct races. F. Muller in a similar but simpler fashion recognized two main divisions, the woolly haired (*ulotrichi*) and the straight haired group (*isotrichi*), each of which had two subdivisions. The former was divided into the tuft haired (Papua, Hottentot Bushmen) and the fleecy haired (African Negroes). The straight haired group was divided into the stiff haired (Australian Malay, Mongolian, American) and the wavy haired (Dravidians of South India, the Nubians of the Sudan and the Mediterraneans of Europe and North Africa). The tuft haired group was based on an erroneous observation that certain people like the Bushmen had hair growing only from spots or tufts on the scalp.

Natural hair forms are arbitrarily distinguished as follows (a) straight (b) wavy (low medium and deep waves recognized measuring from crest to crest) (c) curly when the hair forms at least three fourths of a circle (d) woolly with closely coiled spirals matted together (e) frizzly with deep short waves present without forming spirals. Straight hair occurs typically in the Mongoloids wavy or intermediate types are found in most Caucasoids and woolly hair is characteristic of the Negro. This distinction is dependent upon the cross sectional appearance of the individual hair as well as the degree of straightness or curvature of the hair's root sac in the skin. Straight hair is circular on cross section the two diameters are almost equal while wavy hair appears oval and woolly hair is much flattened particularly so when designated frizzly. The beard and body hair growth attain greatest development in the Caucasoids. The length of head hair is greatest in Mongoloids and least in Negroids.

Hair color generally corresponds quite closely in skin color. Dark colored hair and skin are closely associated as well with dark colored eyes. Conversely fair complexioned blondes have blue eyes as a rule for example as found in the Alpines. However this correlation is not always so since in Cornwall and Brittany there are very attractive dark-complexioned dark skinned light eyed types. Hair may be of any shade or tint varying from jet black to light blonde with the intervening dark reddish or light brown and light brick and rufous.

The color of the iris or eyes similarly presents an infinite series of gradations varying from the unpigmented Albino eyes to the very dark brown or black eyes of the Negro depending on the amount and not the kind of pigment found. Blue green gray brown and black and their various combinations occur. Speckled or piebald irides are seen for example when brown pigment deposits are scattered throughout an otherwise blue or gray eye. Heterochromia or dissimilar pigmentation of the irides is noted as a congenital anomaly.

After this brief and rather sketchy consideration of the chief physical characteristics upon which racial classifications are based it may be stated in recapitulation that the most important of these are in general the skin and hair color the hair texture and the shape of the head face and nose.

Of necessity it will be possible to cover so vast a subject as ethnology only in the briefest manner. A detailed discussion of this aspect of the subject is moreover not essential for our purposes. A few comments concerning the subdivisions of the main racial groups may thus be of interest in this connection.

According to Fy Cooper Cole the races of mankind may be grouped conveniently into the following categories with their main geographic distribution being indicated

I CAUCASOIDS

- (a) Nordic North Europe around the Baltic and North Sea
- (b) Alpine Central part of Europe
- (c) Mediterranean Around the Mediterranean shores in Southern Europe and Northern Africa
- (d) Hindu North and Central India

II MONGOLOIDS

- (a) Asiatic Mongolian including North and Central Chinese and other inhabitants of North Asia
- (b) Malay British Malays Dutch East Indies Philippines Formosa also parts of South China French Indo-China and Burma
- (c) American Indian

III NEGROIDS

- (a) African Negro
- (b) Oceanic Negro Solomon Islands New Guinea and nearby islands
- (c) Pygmy Black or Negrito including Hottentots and Bushmen

The name Caucasian is derived from Mt Caucasus as in its neighborhood is found the supposed typical white man. This race includes the following peoples ancient and modern Assyrians Medes Persians Jews Egyptians Chaldeans Georgians Circassians Armenians Arabs Syrians Afghans Greeks and the nationals of all modern Europe and their descendants in America. A peculiar feature of this group is the advance ment of the forehead to the line of the face.

The Caucasoids tend in general to be of a light color the Nordics are blond the Alpines pale complexioned the Mediterraneans being exposed to considerable sunlight are light brown and the Hindus vary from brown to dark sepia. The Nordic race includes the Scandinavians Dutch Northern Germans some Russians as well as many Scotch and English. They have a fair ruddy complexion not easily tanned flaxen hair that is straight to slightly wavy blue eyes long face with high narrow bridged prominent nose high oblong head. They are of tall stature.

The Alpine race is composed mainly of the Swiss Southern Germans Slavs French Northern Italians with a branch extending into Asia. The West Asiatic branch found in Armenia Mesopotamia and Southern Arabia have endowed many Jews and Arabs with their characteristic nose. It may be quite clearly seen that the Alpine race constitutes a rather heterogeneous group much more so than either the Nordic or Mediterranean race between whose geographic belts this race is distributed. While

it is naturally difficult to describe in the abstract so diversified a group it may be said that they tend to be of medium stature and heavy build have straight to wavy brown hair generally with a heavy beard and prominent features with a broader face than the Mediterraneans (Fig 5)



Fig 5—Tatar woman Orenburg district (Fischer Moscow)

The Mediterranean race as the name implies is distributed along the shores of the Mediterranean in Europe Asia and Africa including the inhabitants of the Mediterranean peninsulas and islands parts of Arabia and Africa north of the Sahara They have swarthy to tawny complexion with medium to dark brown eyes a long narrow head with projecting occiput oblong face with a straight nose small mouth with well curved lips dark wavy hair and an abundant beard

The Hindu is an inhabitant of Central India and while dark skinned he is Caucasoid in all essential physical characteristics although the pure racial type has been considerably modified through intermixture (Fig 6)

An alternative but rather antiquated classification of the white race now seldom employed is based on Biblical nomenclature the names corresponding to the descendants of Noah Accordingly they were disun

guished as the Hamitic (Berbers Egyptians Somalis) the Semitic (Arabian Abyssinian Hebrew) and Japhetic (Celtic Teutonic Slavic Italic and Iranian) The Hamitic nations now relatively unimportant were in early antiquity the torchbearers of civilization but they have since been replaced in dominance by the Japhetic branch The Aryans



Fig 6—Hindu girl (Umlauff Museum Hamburg)

a much misused and unfortunate term originally occupied the Iranian or Persian Plateau migrating into Europe and India

The Mongoloid race (Fig 7) found predominantly in Eastern Asia spread westward across the continent and also to North America via the Behring Strait They are characterized by yellow to yellowish brown skin brown eyes straight black hair oblong to broad head broad flat face with

prominent malar bones narrow sunken oblique eyes with epicanthal folds and with a rather low flat nose Especially distinctive are the so-called shovel shaped incisors of Hrdlicka referring to the shallow depression of concavity found on the inner surface of the upper incisor teeth this fossa is surrounded by an enamel ridge



Fig 7—Mongol man. (Ploss and Bartels)

The Tibetans (Fig 8) belong primarily to the Tibeto-Burmese subdivision of the yellow race They are of medium stature of yellowish color and have coarse black hair somewhat wavy The obliquity of the eye is much less marked than in the typical yellow race The Aino are aboriginal inhabitants of Yezo the remnants of an extensive population

of the islands. They are noted for their hurriness. They are of short stature, very strong and active. The women tattoo a mustache like figure around the mouth. The Koreans belong to the northern Mongols but have been mixed from ancient times with the Chinese, Japanese and Manchurians.



Fig. 8—Tibetan man (Ploss and Bartels)

The Arabs (Fig. 9) are Semites closely allied with the ancient Arameans and Assyrians inhabiting the desert country of Arabia and widely spread in Africa. The Arabian type is one of the finest in the world and as a nation the Arabs are highly gifted intellectually. They are of medium height with oval head and face, refined features, black hair and fair skin.

soon bronzed by the sun. The Arab is wiry and nervous and gifted with great energy and endurance.

The Malays originate chiefly from the southeastern Asiatics, but have blended with the Australoids, Polynesians, Melanesians, and other races



Fig. 9—Arab man (Ploss and Bartels)

representing consequently a rather divergent subdivision of the Monolians. Their heads and faces are, as a rule, of the broad type, the jaw tends to project, the mouth is large, the lips are thick, the nose is short with wide, pituitous nostrils, the cheek bones are prominent, and the eyes are moderately separated. The color of the skin in the true Malay is light brown or tawny, the hair is black, lank, coarse, and abundant.

They are prone to develop a peculiar type of mental aberration termed running amuck comparable to hysterical outbursts during which they are seized with an intense homicidal mania killing everyone who crosses their paths with their large broad bladed knives until they themselves are killed or captured. Their nervous systems often are almost insensible to bodily pain.

The Dyaks are chiefly of Malayan stock and live mainly in the heavily forested interior of Borneo. The skin is light brown, the hair is jet black and straight or wavy, the nose is short, wide and flat. The Igorots are



Fig 10—Negrito woman from the Andaman Islands (Museum of Natural History Paris)

of Malayan stock and live in the higher central portion of Luzon principally in the Province of Lontoc. The Igorot is of a cheerful disposition strong of medium stature with black eyes and hair and smooth skin. He differs little from the Dyak of Borneo to whom he is related.

The Filipinos are of Malayo Polynesian race. The Negritos (Fig 10) are small black woolly haired natives inhabiting out of the way places in several islands of the Philippines but living in the great island of Luzon mostly. They call themselves Acta because they are very shy and make their homes in the mountain forest. They are cheerful intelligent peaceable and moral. While physically the Negrito seems inferior in reality he is strong, marvelously agile and his black wizened dwarfish frame is capable of incredible endurance. They are also termed Negrillos referring to the African representatives who inhabit the lush tropical forest six degrees north and south of the Equator. They average about

54 inches in height, and aside from being brachycephalic, resemble the typical Negro in almost every other respect. The Negritoes comprise the Andamanese, the Semang of the Malay peninsula, the Aeta of the Philippines, and the Tapiro of Netherland's New Guinea



Fig. 11a—Australian man.

Closely related, no doubt, to the Pygmies are the Bushmen and Hot tentots of South Africa. They are also small statured, averaging about five feet, but have lighter skins. Especially noteworthy is the presence of steatopygy, or tremendous, shelf like fat accumulations in the buttocks of the women, which is regarded as a contribution to the appearance of its possessor in direct proportion to its size. Just exactly how or why the pygmy races developed is another anthropologic puzzle yet to be solved

The Samoans are of the brown Polynesian race which at some early period spread over the Pacific to numerous widely separated islands and reached to within 1800 miles of the South American continent. The Samoan Islands were visited by the Dutch Roggeveen in 1722 and named by Bougainville in 1768. The Maoris are of the Polynesian family and inhabit the island of New Zealand. They are tall very well formed and have straight black hair and good features. They are among



Fig. 11b—Australian (Straatz)

the most perfect specimens of mankind. The Maori are at present upon the verge of extinction.

Oceanic Negroes is exemplified by the Papuans doubtless had at one time a rather wide distribution but at present are confined chiefly to New Guinea, Melanesia and Tasmannia. They have black woolly hair, chocolate-colored skin, and are long-headed with receding foreheads, well-marked brow ridges, and broad noses. Although the African and Oceanic Negroes represent the two large branches of the black race, they are found on opposite sides of the Indian Ocean and are sufficiently close in resemblance to disturb the anthropologist who speculated about prehistoric land bridges that might have connected these subraces at some vastly remote time.

The black aboriginal inhabitants of Australia the so called Australoids (Figs 11*a* and 11*b*) though obviously Negro have hair that is oval on cross section like the Caucasoid. According to Huxley they form a separate race. They are black tall sparsely built with bushy but not woolly hair. The skull is long the nose very flat and deeply inserted under the brow and the lips are thick.



Fig. 12.—Zulu girl (Straatz)

The Veddhis are the true aborigines of Ceylon and one of the primitive types of the human race. They are an Australoid-Caucasoid mixture. They live on the coast of Ceylon.

Even in the black or Negroid race various degrees of pigmentation are noted. Broadly speaking, most of Africa south of the Sahara is inhabited by Negroes, the purest types being found along the West Coast. The Negro is medium to tall in stature, has woolly hair, a long narrow low skull smaller than the Caucasoids, with a retreating forehead, platyrrhine nose, prognathous jaw, and thick lips. The Zulus (Fig. 12) are representative of the populous and powerful Bantu family. The Zulu Kaffir and related Bantu tribes are physically strong and energetic and not so dark as the true Negro. The Zulus are tall, dark brown, have woolly hair.

of elliptical section and have long skulls. The chiefs of the Zulus were selected for their mental and physical qualifications.

The Berbers belong to the Hamitic stock of the white race scattered throughout North Africa. They are tall, well proportioned, and more muscular than the Arab. They have bronzed skin, brown eyes, and black straight hair. This ancient stock once occupied southern Europe, the



Fig. 13—Pure Somali woman (Museum of Natural History, Paris)

Spanish peninsula, the Canary Islands, and the islands of the Mediterranean.

The Somali (Fig. 13) live in East Africa, their country being known as Somaliland. They are related to the old and modern Egyptians, the Assyrians, the Masai, and other African peoples of the eastern branch of the Hamitic stock. They are dark in color, of fine physique, and have straight noses. Their hair is typically ringlety, though sometimes it is quite straight.

The Bambara are Sudanese Negroes living on the Niger and belong to a branch of the Mandingan family. In art, the Bambaras have been advanced by their position as middlemen between the coast and the

interior. The Wichag, who are Africans of Bantu stock, live on the southern slopes of Mount Kilimanjaro, East Africa. They are a friendly people but exceedingly superstitious. The Wolof are Negroes of the western Sudan, living between the lower Senegal and the Gambia Rivers. They are tall and intensely black and have regular features.



Fig. 14a—Eskimo man

The Eskimo (Figs 14a and 14b) is a specialized subgroup of the yellow race inhabiting the shores of all the seas, bays, inlets, and islands of America north of latitude 60 degrees from the east coast of Greenland to Bering Strait. The western Eskimos live on the Alaskan coast from the Aleutian Islands to Point Barrow. On account of the better food supply and the mild climate, they have advanced further than their relatives in

the east. The central Eskimos live in the area between Hudson Strait and Baffin Bay. The Smith Sound Eskimos are called the Arctic Highlanders and are the most northern people in the world. The eastern Eskimos inhabit Greenland, the shores of northern Labrador, and Hudson Bay adjoining.



Fig 14b—Eskimo mother and child.

The American Indian (Figs. 15a and 15b), another subdivision of the Mongolian race, is of short to tall stature, has yellowish brown to coppery red (Plains Indian) skin with long, coarse, black hair, and dark brown straight to somewhat obliquely placed eyes, a large, massive face with projecting jaws and cheek bones, and a large, straight, or aquiline nose. Although there has been more or less blending of the Eskimo and the Indian along the line of contact from Alaska to Greenland, the two races in their totality stand well apart. The Indian, whose bold features stamp him as one of the ablest of the races, occupies today the entire continent from the Eskimo boundary to Patagonia. In South America, there appears no definite trace of the Mongol, the facial type being characteristically Indian.



Fig. 150.—Amer can Ind an (C urtesy of Henry Fa rfield
O b r n fr m the Sm h s an Inst tut on)



F g. 151.—Amer can Ind an of today (C urtesy of Henry
Fa rfield O b r n fr m the Sm h s an Inst tut n)

While a great diversity of different types has been described briefly, when the question of individual differences is considered, the diversity becomes increasingly and correspondingly greater, but even amid these great differences a certain unity is nonetheless clearly in evidence.

Much racial hatred is dependent upon the ubiquitous idea of superiority entertained by the group to which one happens to belong. Despite this idea, the case for the inherent biologic superiority of one race or group over and against another is still unproved and will, in all probability, remain so, and since purity itself is such a questionable thing the whole problem at once becomes somewhat ludicrous, though, of course, tragic as well.

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CHAPTER VII

FACIAL DECORATION, ADORNMENT, AND CUSTOMS

STANDARDS OF BEAUTY are as much a matter of geography as are morals. What is regarded as the height of perfection in one country is unspeakably hideous, repulsive or disgusting in another. Since physical attractiveness is dependent in no small measure upon the face, more attention has been centered on it perhaps than on any other part of the body. Since a desire for appreciation and recognition is a universal urge, it is therefore but natural that people should strive to render themselves as acceptable as possible to the group. This can best and most easily be done by conforming to its arbitrary, often highly illogical, norms or standards of conduct.

Enhancement of appearance, however, is not by any means the only purpose of facial adornment. Among many savage and primitive peoples it is chiefly or solely practiced for the purpose of class distinction or clan identification. Then again, some of the marks may have a religious or ceremonial significance alone, designed to invoke the gods or frighten the evil spirits, or more concretely the enemy. In other instances it would appear that fashion and convention determine in an inexorable manner just what form the adornment will take, which may indeed be most bizarre, inconvenient, artistic and impractical. The ultimate origin of many primitive rites and customs, however, still remains shrouded in obscurity.

Broadly speaking, the methods of facial adornment and decoration employed may be considered under the following heads: (a) Pigmentation, (b) ornamentation, (c) disfigurement and (d) reconstruction or transformation (cosmetic or plastic surgery).

The oldest and still most exploited of these is pigmentation, or the application of temporary or permanent dyes or pigments to the face. Rouge, lipstick, powder, mascara, eye shadow, and numerous other cosmetics of the modern woman are not so far removed as we might imagine from the war paint of the savage, even though from our standpoint the results are so incomparably superior. Indeed, the ancient Egyptian lady 4000 years ago was no less adept and fastidious in the fine art of grooming than her contemporary counterpart. The sleek sirens of the Nile painted their lips, cheeks, and eyebrows with telling effect, mixing the

pigments on an alabaster pallet like an artist until just the precise shade was obtained. Black pomades were applied to the lashes to enliven their beauty and fragrantly perfumed oils and ointments of myrrh and frank incense were used without stint. Even the prosaic Eskimo woman anoints her skin with grease and fat. This is a jealously guarded complexion secret handed down to her from her mother.

Aborigines have as a rule a very well developed color sense. They are particularly fond of bright clashing hues. The native Ansiarahns, the so called *Australoids*, painted their bodies red, yellow, black and white, putting spots on their faces and frequently circles around their eyes. This was assuredly symbolic, but could hardly be interpreted as a naive gesture of sophistication. It was generally done only on occasions of especial importance. In New Zealand it was customary among certain of the tribes for both of the sexes to dye their lips blue. The American Indians donned their paint and full regalia before going on the warpath or during a tribal ceremonial dance. The modern paint bespattered circus clown shows that our love for the gaudy still survives.

Tattooing is of great antiquity and without doubt is the most wide spread, nay almost universal form of self-adornment practiced (Figs 1 and 2). It was Darwin, in fact, who said that there was scarcely a country from the polar region in the north to New Zealand in the south where the natives did not employ tattooing. The ancient Thracians, Assyrians and Britons used it extensively, and throughout Australia it is still rather prevalent, the modern sailor's partiality for it is traditional.

Tattooing is a slow, tedious, rather painful procedure whereby indelible pigments are permanently introduced into a pattern on the skin by means of an awl or needle dipped in the desired coloring matter. Among the Abipones, an almost extinct tribe of South American Indians, the women decorated their faces, breasts and arms with sundry designs made with sharp thorns dipped in a mixture of blood and ashes. It would seem that a lady always has the price for being in fashion. Among the New Zealanders, the art of tattooing reached a rather high stage of perfection. Tattooing on the lips was not at all infrequent, although needless to say, exquisitely painful. Intricate scroll work patterns were especially favored as seen on the faces of Maori chiefs.

Frazier suggests that besides being a mere form of decoration, tattooing may have originated in part for the purpose of placing the savage more fully under the influence of the totem or tribe, as the marks were sometimes used for identification of the clan. In India, in fact, a tattooed black spot on the forehead is an unmistakable sign of the particular caste to

which the individual belongs and is comparable to a cattle brand. Certain African tribesmen tattoo themselves in order to indicate their prowess in war and to present a terrifying appearance if it might serve to intimidate the foe. In New Guinea in some of the tribes no girl is eligible for

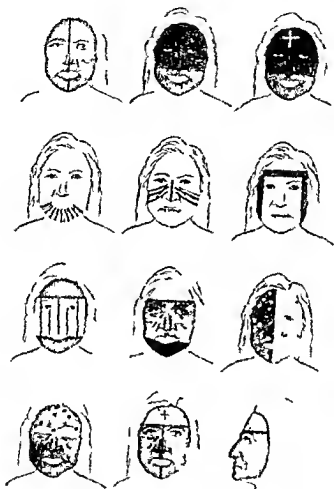


Fig. 1.—Facial decorations in Indians (From Text)

marriage unless tattooed, this decoration being done obviously for the sole purpose of beguiling the susceptible male.

Ornamentation refers of course to the use of extraneous materials for decorative purposes. It is as old as the desire for self-adornment, which takes us back to the very origin of the human race itself. Carlyle wrote in this regard: "The first spiritual want of a barbarous man is decoration." The savage delights in decorating himself in feathers, beads, rings,

flowers, shells, bracelets, anklets, stones, bones, teeth, skulls, or, in short, anything animal, vegetable, or mineral that he might find available. Movable appendages or foreign bodies are inserted or suspended in the ear, nose, lips, or other convenient parts (Fig 3). Trophies and amulets



Fig 2—Facial decoration. Head of chief who cooked two Christians in 1842
(Courtesy of the Smithsonian Institution)

are hung on the body for reasons of vanity and superstition. Occasionally, the men alone, as in New Hebrides and New Hanover, appropriate all the ornaments, but generally they are more or less equally divided as the men and women alike gaily decorate themselves.

Rings were worn in the ears, nose, and lips long before they were used on the fingers. Farrings are worn and treasured by savages the world over. Among some tribes the ear lobules are artificially enlarged until they hang

down to the shoulders. Small discs are inserted in the pierced ears in childhood and are replaced with progressively larger ones until eventually the ears reach the size of stumps. Nose rings are employed not only in cattle to render them docile and easily manageable but even by certain of the human species who regard them as an essential part of dress. Some



Fig. 3—Lip decoration. Hotocudo woman of Brazil (Museum of Natural History, Paris)

Papuans even insert sticks through a perforation in the nasal septum while others use a piece of bone as thick as a finger and three to four inches in length. In Eastern Central Africa the so-called *duck billed women* distend their lower lips to truly gigantic proportions by the insertion of progressively larger discs until their weight becomes so great as to interfere with closing the mouth. At that time their appearance is considered to be especially distinctive although incredibly ugly from our viewpoint (Fig. 4).

Disfiguration or deliberate *self mutilation* is difficult to understand but as remarked no price is too high to pay for being fashionable and it is still practiced today although in a minor form as evidenced by the *unstylist* of only a generation ago. Just as the Chinese women bound their feet greatly compressing and distorting them so too did the Aus-

trahian mothers press down their babies noses and flatten them so that they would not be like the sharp *tomahawk noses* of the Europeans. The Samoan mothers also flattened out the babies foreheads so that the skull would assume a sugar loaf appearance. Cranial deformation common among the ancient Peruvians, Northwest Coast Indians and certain African tribes was also practiced by tightly binding the infant's skull with cloth or boards until it assumed the desired shape. Scarification or cicatrization is a widely practiced form of scar tattooing and is accom-



Fig. 4—Lip decoration. Duck billed woman of Eastern Central Africa
(From Ploss and Bartels.)

plished by repeatedly cutting the skin in the same place until an elevated scar develops. Since the Negro race as a whole is characterized by a fibroplastic tendency, they react to injuries with the formation of keloidal or hypertrophic scars.

In some African tribes the scarifying is done with sharp shell fragments which is followed by the application of black paint. Others rub wood ashes into the freshly made wounds on the face and body, causing them to swell and heal with the production of a livid purple scar which is highly admired. Quite analogous are the dueling scars on the faces of the German students of a few decades ago when only the saber could settle personal affronts or differences of opinion. These scars were very much prized by the possessor and respected by the beholder. They were

in short a lifelong mark of disinction and the honor accorded was directly proportional to their number and severity

Teeth likewise have been subjected to mutilation In the Malay Archipelago they are filed to a point and painted black In Australia and among certain tribes of New Guinea it is customary to knock out the upper two front teeth from the jaw when the boy reaches maturity Mutilations of the nose and lips have already been described Amputations of the nose and ears it may be recalled once constituted the legal penalty for miscreants

Reconstruction or transformation represents the highest expression of man in his external effort to improve personal appearance and is included in the domain of plastic or cosmetic surgery It attempts to replace parts lost through injury or disease by means of skin grafting cartilage transplants and the like or to conceal the defect with a suitable prosthesis or artificial eye nose ear etc It also strives to correct congenital malformations such as harelip ptosis of the lids outstanding ears to improve nasal deformities such as saddle humped or twisted noses to remove moles warts birthmarks and tumors to excise wide unsightly scars and to elevate sagging relaxed tissues

Fashions in hirsute facial adornment are subject to marked variations in different countries and at different times and are mostly the concern of the Caucasoid race as the other races have a relatively sparse growth of beard The shape and character of the beard and mustache worn in times past were a fairly reliable index of one's social or professional status Mustaches have varied from the fastidiously groomed waxed handle bar mustache of the nickelodeon villain and the drooping soup-straining walrus type or bartender mustache of a generation or so ago (that necessitated the use of the famous mustache cup) to the pencil line mustache of the Lothario of a passing decade Beards likewise have ranged in style from the sedate dignified pointed Van Dyke or goatee worn by that fast disappearing species the family doctor to the luxuriant flowing beards of the patriarchs Not to be neglected are the sileburns of the Latin and *bon vivant*, or the pork-chops of the Victorian period The present trend is very definitely in the direction of smooth shaven elegance The modern female adds to her lure with plucked eyebrows and long artificial lashes

Customs centering about the face are those concerned with the forms of salutation homage, and affection Concealment of the face by veils so characteristic of the Moslem world arose because of the taboo against

women showing their faces in public—a most shameful and indecent thing to the Mohammedan. This same restriction was also observed in certain African tribes. Elaborate and grotesque masks were used by the Indians in their ceremonial dances, not primarily to conceal the face but rather because of their symbolical significance.

Falling on the face was one of the earliest forms of obeisance and is observed to this day among the Sandwich Islanders, being at once a sign of respect and submission. A very similar custom prevailed among the early Egyptians called *sentu*, literally meaning to breathe the ground. An individual paid homage to a person of importance by prostrating himself on the ground and kissing the earth. The Coast Negroes, too, kissed the ground three times in the presence of their superiors and in some African tribes persons kiss the ground over which their chief has trod. In the lower Niger, the natives salute their superiors by falling to their knees and striking their foreheads on the ground, not unlike the kowtow of the Chinese. This striking parallelism of customs in widely separated places constitutes a most fascinating aspect of this subject.

Forms of salutation vary greatly among different peoples, and to us many are strange, quaint, and needlessly complicated. Thus the Islanders near the Philippines greet a person by taking his hand or foot and rubbing it on his own face. In the Straits of the sound it is the custom on greeting someone to raise his left foot, pass it over the right leg and then the face. The Polynesians, Laplanders, and Eskimos greet by rubbing or pressing their noses together in which manner they also express affection. Kissing the hands or feet was a primitive form of homage also extensively practiced among royalty and among the ancient Romans kissing the mouth or eyes was considered a respectable form of greeting.

Havelock Ellis, in his 'Psychology of Sex,' states 'Manifestations resembling the kiss are found among various animals lower than man. Snails cross antennae. Birds use their bill for a kind of caress, and the dog who licks his master is really kissing him.' The kiss no doubt first originated as a token of affection and tenderness when the primitive mother sought to quiet the restless, noisy infant by placing her lips over those of the child. In France the kiss established itself early as an indispensable part of love and courtship as a "seal with which lovers plight their troth." Even most dance figures ended with a kiss. Louis XII is reputed to have kissed every woman in Normandy. From France the kiss rapidly spread all over Europe and in Russia it became incorporated in the court routine. A kiss from the Tzar was the highest and most sought after form of official recognition.

References to the face have even crept into popular sayings. Thus one is accepted at his face value. To lose face for reasons of disgrace or dishonor is the one intolerable thing among the Orientals, with whom even self extermination is a preferable alternative.

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CHAPTER VIII

CONGENITAL ANOMALIES OF THE FACE

CONGENITAL MALFORMATIONS affecting the face may involve any or all of the component parts eyes ears nose mouth cheeks and jaws they may be of any degree of severity and are frequently associated with other anomalies that may be incompatible with life itself Roughly speaking these *facial abnormalities* of congenital origin may be classified as persistent fissural defects external sense organ anomalies and conjoined



Fig. 1a—Case of aprosomus (From Ballantyne)

twinning of the symmetric and asymmetric types Because of the great number and variety of these anomalies it will be possible to enumerate them only hastily and comment briefly on the more interesting or important ones

A study by Potter and Adair of the stillbirths which occurred at the Chicago Lying In Hospital from 1931 to 1938 revealed that there were 17 728 infants delivered during this period congenital malformations occurred in 531 or eight per cent



Fig. 16—Aprosopus. Complete failure of fusion of facial components (Northwestern University Collection)

Rarely there may be a complete arrest of facial development resulting in a featureless unrecognizable structure termed *aprosopus* (Figs 1a and 1b). This is a rare monstrosity in the human subject. In the acephalic monsters there is a total absence both of the head and face and of the heart (*acardiacus acephalus*) or contrariwise only a diminutive head may be attached to an amorphous embryonal mass (*acardiacus acornus*).



Fig 2—Asymmetrical development of face (Note compressed appearance of the right side) (Northwestern University Collection)

Variations in the development of the brain and cranium will of course also affect the conformation of the face (Fig 2). Thus in an encephaly (Figs 3a and 3b) because of the failure of the brain to develop the cranial vault is deficient or lacking and the head accordingly, presents a collapsed appearance with the forehead virtually absent. In *microcephaly* the skull conforms to the underdeveloped brain and the



Fig 3a—Anencephalus (Dr E. Potter Chicago Lying In Hospital.)

popularly designated human pin head results This is the dime museum characterization which indicates however that only by pandering to morbid public curiosity can these unfortunate individuals be self sustaining as the accompanying idiocy leaves institutionalization the only alternative

Macrocephaly or *hydrocephalus* (Figs 4a and 4b) is characterized by excessive enlargement of the head which may indeed attain tremen-

dous proportions. This is due to a congenital blockage of the cerebrospinal fluid circulation often at the aqueduct of Sylvius between the third and fourth ventricles with a resulting accumulation of cerebrospinal fluid in the lateral ventricles which become greatly dilated caus



Fig. 3b—Anencephalic monster with two frontal meningoceles (The colored area on right cheek is a contusion) (Northwestern University Collection)

ing a pressure atrophy of the brain tissue. The face appears disproportionately small when compared to the broad, domelike, bulging head with overhanging brow. The exposed upper sclerae due to the retracted upper eyelids give the features a characteristic stamp.

Munro Kerr describes *hydrocephalus* and states that in this condition the cerebral ventricles are distended with cerebrospinal fluid. The quan

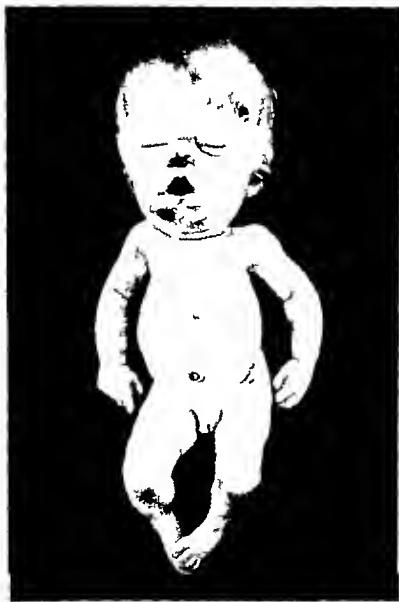


Fig. 4a—Hydrocephalus (Dr E. Potter, Chicago, Living in Hospital)

ity may reach as much as 10 to 15 pints (6 to 9 litres) and the circumference of the head may be as much as 50 inches (70 cm). The trunk of the child is generally puny, the face is small although well formed, but the vault of the cranium is enormously distended, the individual bones being separated by gaping sutures and fontanelles.

Herniation or protrusion of the dura or brain itself may occur through localized skull defects and the base of the nose is not an un-

common site for frontal *meningoceles* (Fig 5) or *encephaloceles* (Figs 6a and 6b) These present themselves as soft compressible masses that increase in size with coughing crying or straining They are cystic growths consisting of the meninges with or without brain tissue They



Fig 4b—Hydrocephalus (Northwestern University Collection.)

must be differentiated from *dermoids* which also are prone to occur in the same location but instead are firm solid semi-globular tumors attached to the underlying bone

Failure of the facial processes to unite properly during fetal development accounts for the common fissural defects resulting in *harelip cleft*



Fig 5—Frontal meningocele (Northwestern University Collection)

palate, lateral and oblique facial clefts and the exceedingly rare intermandibular and median nasal fissures

A few words of recapitulation concerning the embryology of the face may not be amiss here. The branchial arches and their intervening clefts which normally close between the ninth and tenth weeks of fetal life participate in the formation of the face. The mandibular and hyoid arches



Fig 6a—Occipital encephalocele (From Ballantyne)



Fig 6b—Hernia cerebri occipitalis (cerebellar hernia) (Courtesy of Dr J H Hess.)



Fig. 7—Multiple anomalies. Absence of lower jaw, lower limbs and flipper like upper extremities (Northwestern University Collection)

are separated by the first branchial cleft. The first or mandibular arch is the one chiefly concerned in the development of the face. It is composed of a maxillary and a mandibular portion which unite to form the upper and lower jaws. The maxillary portion unites with its fellow through the lateral portion of the frontonasal process that is separated from the medial one by the olfactory pit. The medial portion of the frontonasal process goes to form part of the forehead as well as the bridge and septum of the nose. The alae of the nose and the contiguous cheek

are derived from the junction of the lateral frontonasal and maxillary processes with resulting obliteration of the lacrimal groove which however may persist as a lower eyelid defect in some instances

Between the respective portions of the mandibular arch is the buccal cleft which closes except for the stomodeum. Anomalies of the mouth



Fig. 8—Prognathism

occur through faulty development. Complete closure produces *atresia* or *astomia*; excessive closure causes *microstomia* or small mouth while at the other extreme defective closure gives rise to *macrostomia* or large mouth. These are asymmetric types which may be produced also by lateral facial fissures.

Closely associated at times are the congenital developmental jaw defects including *agnathia* or total absence and *micrognathia* or *hypo*

plasia of the mandible causing the typical receding chin of the bird face which may also be brought about by ankylosis of the jaw or loss of bony substance from injury or disease (Fig 7) *Agnathia* is comparatively rare in the human subject. It is found frequently in the lamb possibly because it points to an undiscovered peculiarity in the onto-



FIG 9—Bilateral hare lip (Northwestern University Collection)

genesis of that animal the most striking feature of this monstrosity is the complete absence of the chin. *Prognathism* or protrusion of the lower jaw may occur congenitally or as a result of acromegaly (Fig 8) *Polygnathia* or supernumerary jaws and intermandibular clefts are so extraordinarily uncommon that for all practical purposes they can be ignored the latter anomaly of course appears because of nonunion of the mandibular process. The basis for this however is no clearer than is the case with the much more prevalent harelip

Hare lip (cheiloschisis) next to polydactylism is probably the commonest type of congenital anomaly. It is a congenital labial fissure due to non union between the median nasal and maxillary processes and despite the name is not like the median notched lip of the rabbit or hare but occurs laterally at either or both sides of the midline corresponding to the margins of the intermaxillary bone. It may vary in extent from a slight scarcely discernible notch in the upper lip at the vermillion border to a deep yawning cavernous defect extending into the nostril and accompanied by a complete cleft of the hard and soft palate causing the oral and nasal cavities to communicate directly. In cases complicated by alveolar and palatal defect the nose is considerably broadened flattened and distorted. In bilateral hare lips (Fig 9) there occurs a protrusion of the intermaxillary bone producing the unsightly *wolf snout* deformity. Hare lips are commonest in males and are generally unilateral and on the left side. They may be partial or complete single or double simple or complicated by cleft palate. Their origin is obscure but their occurrence in cubs from mothers fed boneless meat suggests a possible metabolic determinant although their familial occurrence in the human points to the importance of hereditary factors.

Other types of persistent fissural defects of the face are the much rarer lateral facial clefts arising from non union between the medial and lateral nasal division of the frontobasal process and the still rarer oblique facial cleft from failure of fusion of the maxillary and frontonasal processes (Fig 10). This may or may not be associated with a coloboma of the lid. In both of these anomalies the cleft originates from the mouth and in the former it extends for a variable distance laterally into the cheek greatly enlarging the mouth and producing a unilateral macrostomia. In the latter type the cleft ascends obliquely from the mouth in the direction of the eye the lower lid of which may also be involved in the fissures (Fig 11). Cases of multiple facial clefts along the lines of fusion of the embryonic processes have been reported. It is of interest too that dermoids representing no doubt fetal inclusions occur most frequently at these points. The very uncommon median nasal cleft has been ascribed to amniotic adhesions and is characterized by a fissure on the dorsum of the nose.

Adhesions between the cranium or face of the fetus and the amnion have been described as instances of adhesion of the head to the placenta since in many of these cases the adherent part of the amnion has been that covering the fetal surface of the placenta.

A congenital tumor of the face in an infant has been described by Ballantyne. The growth was about the size of a tangerine orange and



Fig. 10—Facial fissure (Courtesy of Dr. E. Potter, Chicago Lying in Hospital.)

appeared as if it were growing out of the right side of the nose in immediate proximity to the right eye. On its outer aspect were two incisor teeth, which were cut at the same age (eight months) as the ordinary teeth inside the mouth. The tumor was regarded as an accessory upper jaw. On operation it consisted partly of bone, partly of fibrous and mucoid tissue, and partly of hyaline cartilage.

The external organs of special sense, because of the great complexity of the developmental processes, are subject to innumerable variations

and anomalies, some of which may be pointed out here. Thus, the eye, for example, may be abnormally small—*microphthalmos*—a condition affecting one or both eyes. Rarely, the eyes may be absent altogether—*anophthalmos*—although, microscopically, embryonic ocular remnants are generally in evidence (Fig. 12). Absence of the eyeball either on one side only (*monophthalmos*) or on both (*anophthalmos*) is not as rare



Fig. 11—Complete bilateral fissure (coloboma) of face (From Guersant)

as *cryptophthalmos*. In *anophthalmos* the optic nerves may be absent, or atrophic, and the atrophy may extend to the optic chiasma and *corpora quadrigemina*. The contents of the orbit may be simply connective tissue, or the muscles of the absent eyeball may be discovered. The lachrymal apparatus may be perfect, or the *carunculae* defective. The eyelids may also be complete and capable of movement; the palpebral slit is usually small, and there may be adhesions of the margins of the lids and some degree of entropion. The malformation, in itself, does not interfere with postnatal life.

Buphthalmos or *congenital glaucoma*, characterized by intraocular hypertension and globular protrusion of the cornea with enlargement of

the eyeball may occur. The eyelids too may be defective through concurrent involvement in facial clefts or independent colobomas or sector defects may obtain generally in the upper eyelids. In *anxyloblepharon* the palpebral fissure is abnormally narrowed in *symblepharon* the lids are adherent to the eyeball as also occurs in severe burns of the conjunctiva. In *cryptophthalmos* the palpebral fissure is entirely lacking,



Fig. 12—Anophthalmos (Northwestern University Collection)

and the skin of the forehead passes uninterruptedly over the eye to the cheek. This is quite a rare variety and is accompanied by other ocular anomalies as a rule. In *epicanthus* there is a crescentic fold of skin similar to the nictitating membrane of birds occupying the inner canthus usually of both eyes. While normal in the Mongolian race it also occurs in persons with mongolism (mongolian idiocy) hence the name. Without a doubt the most outstanding anomaly of the eye is *cyclops*.

Cyclops, the one-eyed giant of Greek mythology and Homeric fame has his counterpart in human monstrosities (Fig. 13). As the name im-



Fig. 13—Cyclops (Courtesy of Dr. E. Potter, Chicago Lying In Hospital)

phies, they may have a single often rudimentary median eye (*synophthalmia*) within a single orbit, although occasionally both eyes are present, showing various degrees of fusion. Thus the cornea, lens, pupils, optic nerve and other ocular structures may occur singly, double, or partially blended. Arrested development of the embryonal forebrain or *prosencephalus*, which gives rise to the cerebral hemispheres, is believed by some to account for this most striking anomaly since the eyes are in

reality lateral outpouchings of the forebrain vesicles and *cyclencephaly* or horseshoe fusion of the cerebral hemispheres is not an infrequent concomitant of cyclopia. The external nose in the cyclops is replaced by a fleshy cylindrical proboscis situated in the midfrontal region above the eye. This tubular projection may contain small blind mucous lined pouches or even channels communicating at the base with vestigial nasal cavities. Cyclopia more often than not is accompanied by other developmental defects such as *otocephalus*, *epignathus*, *podencephalus* etc. Few of these monsters are viable and none has been reported that lived longer than 72 hours.

The nose like other body structures is not spared by developmental error. It may be congenitally absent or of excessive proportions supernumerary or bifid. Congenital occlusion of the anterior nares though rare does occur. The proboscis of cyclops and the associated distortion occurring with hare lip have already been described as has been the median dorsal fissure or fistula.

The external ear or auricle likewise shows many congenital variations in configuration due to abnormal coalescence of the six embryonic tubercles that unite to form the ear. Preauricular fistulas occur most commonly at the root of the helix. The ear itself may be absent—*anotia* it may be small—*microtia* or very large—*macrotia* or supernumerary—*polytia*. This type frequently projects at right angles to the head and is further designated by the terms outstanding lop or dog ears. These ears can be of normal size. Atresia or stenosis of the external auditory meatus adherent and cleft lobules and Darwinian tubercles are other examples of congenital anomalies.

In *synotia* the ears are fused in the midventral line in the upper cervical region the primordial site of the ear structure before their separation by the growing mandible which is congenitally deficient in these cases. This combination of *synotia* and *agnathia* is spoken of as *otocephalus*. The mouth may be very small or entirely absent. Faulty development of the mandibular process of the first branchial arch is responsible for the production of *otocephalus*.

Potter has reported an hereditary malformation of the ears in five generations. Instead of lying parallel to the side of the head the ear has grown forward over the meatus to form a cup. The inner ear is normal and no other manifestations of the responsible gene have been noted (Fig. 14).

Teeth generally incisors may be present at birth. This antenatal eruption occurs about once in 6 000 new born infants (Fig. 15). It may be associated with hare lip cleft palate tongue tie and cyclops. Irregu-

lapses in dental eruption after birth are very common. Occasionally an additional incisor tooth is present.

Potter and Adair state that merosomatous malformations in the majority of instances would be explained as either temporary or permanent



Fig. 14—Inherited defect in ear form (Dr. Edith Potter
Journal of Heredity 28:7, 1937)

inhibition of local growth. Anencephalus, cleft palate, and harelip are some of the conditions which represent the failure of various structures usually in the midsagittal plane to close normally. The morphogenesis of polysonitous malformations depends in a large measure upon the



Fig 15—Case of congenital tooth in extra alveolar dental sac (From Ballantyne)



Fig 16a—Thoracopagus twins (From Ballantyne)



Fig 166—Janiceps (Northwestern University Collection)

degree of symmetry in the two individuals. Experimental teratology indicates how many of these conditions develop but still leaves the why entirely unknown. More or less symmetric double monsters are assumed to be due either to the partial fusion of two uniovular but primarily separate embryos or more likely to the incomplete splitting of one embryonic plate during the gastrula stage. There is no sharp line between double and single monsters. Abnormally conjoined or united twins are spoken of as double monsters and a great number of such possible combinations exist depending on the degree and character of the duplicity

present. The united twins may be identical and symmetric or dissimilar and unequal in which latter case the larger more perfectly formed one is termed the *autosite* while the smaller one is called the *parasite* and may vary from an almost perfect specimen to an unrecognizable mass of tissue or portion of an extremity.

We shall of course concern ourselves only with those monstrosities involving the face. A pair of twins with an upper ventral face to face

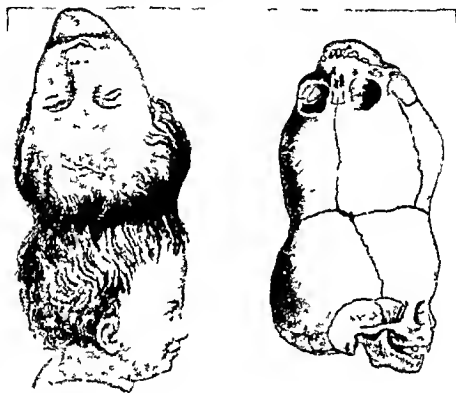


Fig. 17—Craniopagus twins (From Need.)

union with fusion of the chest is termed *cephalothoracopagus* or *janiceps* (Figs 16a and 16b) after Janus the double faced Roman god who looked both East and West simultaneously. In this monstrosity each face looks laterally but in opposite directions and is a composite form of half of the face of each fetus. Asymmetric or *parasitic janiceps* with one small imperfectly formed face also occurs.

In the *craniopagus* type of double monstrosity the twins are united by fusion of the cranial bones at the forehead, vertex or occiput (Fig 17). When joined at the forehead the twins face each other. *Parasitic*

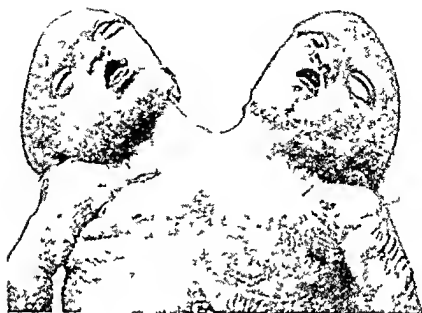


Fig 18a—Dicephalic twin fetus variety dipus dibrachius (From Ballantyne)

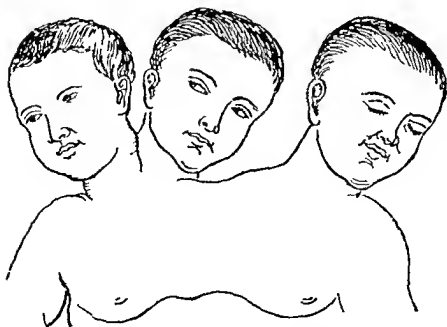


Fig 18b—Three headed monster (From Galoagni)

cranioptagi in which the parasite is generally an imperfectly formed head alone also have been described

The diprosopus is an example of incomplete duplicity. It is a monster with a single body but two heads and two faces with varying degrees of fusion between them. accordingly, there may be four, three, or two eyes (*diprosopus tetro-* *tri*, and *diophtalmus*), thus also there may be four, three, or two ears present (*diprosopus tetro-*, *tri* *diotus*) and two



Fig. 19—Bearded woman

mouths may be fused (*monostomos*) or two separate and distinct heads may be present (*dicephalus*) (Figs 18*a* and 18*b*)

Asymmetric duplicity is represented by the epignathus, a monstrosity in which the parasitic implantation is attached to the autosite in the region of the mandible. The parasite may be a definitive or differentiated fetal part or may be nothing more than a teratomatouslike growth covered with skin and containing a most varied and haphazard assortment of embryonic structures and tissues. Similar specimens occur which receive their attachment at the orbit but these are much rarer.

Unilateral gigantism according to certain authorities represents an abnormal type of twinning. Facial hemihypertrophy may occur in the absence of any corresponding somatic changes. Of considerable interest is

the condition called *congenital hypertrichosis* or excessive hairiness which may be generalized or confined to the face alone as in some of the bearded women (in many such women however the hirsutism appears later in life and is the result of endocrinologic dysfunction or masculinizing ovarian tumors) (Fig 19)

The underlying reasons for the occurrence of these monstrosities constitute an intriguing chapter in themselves. Teratology strives to explain the genesis of these horrifying developmental errors. During the middle ages they were attributed to supernatural or evil influences the result of bestiality or of consorting during menses or with mythologic creatures. Maternal impressions or frights received during gestation were once generally regarded as being responsible and in France at one time the public exhibition of monsters was prohibited because of the grave fear that an epidemic of similar deformities would thereby be precipitated. Surprisingly enough some of these fantastic beliefs still hold sway to a certain degree among the laity.

Even among those versed in this highly controversial and difficult field there is a considerable diversity of opinion as to the relative importance of the intrinsic or germinal factors and the extrinsic or environmental ones. Undoubtedly both play a mutually important role and it is difficult if not impossible to divorce the effects of one from the other. One can produce substantiating evidence for either side which serves only to demonstrate the fact that in all probability both factors are inextricably bound up in each other.

In support of the hereditary hypothesis Adair has shown that the same deformity such as harelip occurs in each of the identical or mono chorionic twins in contradistinction to the absence of similar defects in fraternal or dichorionic twins. Likewise he has pointed out that *mongolism* never occurs in both twins of different sex or in either twin of the same sex. Then too instances of the same congenital defect being transmitted in a family for generations is well known.

Experimental teratology by artificially producing malformations in lower animal forms seeks to determine the importance of nutritional chemical or mechanical causes acting upon the developing ovum. Saint Hilaire father of teratology produced malformations by merely changing the position of the embryo in chick eggs. Stockard more recently has shown that at certain critical periods parts of the embryonal axis are dominant by reason of their rapid proliferation and exert a controlling influence on the course of development but should this dominance be lost or interfered with by cold or reduced oxygen supply either death of the embryo will result or if development continues the appearance

of twins will be noted in the embryonic disc. The degree of eventual duplicity is controlled at will by changes in the nutritive environment. Whether or not these results are applicable or transferable to the human is a question but at least they afford a plausible tentative explanation for phenomena otherwise inexplicable.

In further support for extraneous influences it has been unquestionably shown time and again that therapeutic irradiation of the maternal pelvis by either x rays or radium is hazardous for early in pregnancy fetal death may result or if the pregnancy continues profound alterations especially in the central nervous system as for example microcephalus may be produced. The effect depends on the dosage and the stage of fetal development the younger the embryo the more disastrous the results.

Intrauterine fetal malformations such as anencephalus can occasionally be diagnosed by roentgenographic examination especially when a polyhydramnios or oligohydramnios arouses suspicion of the possible presence of a monstrosity.

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CHAPTER IX

THE HAIR AND THE FACE

ALTHOUGH a careful observation of the human skin reveals that with but few exceptions hair growth appears everywhere only a few parts show a distinct covering growth of longer and denser hair. On the head hairy parts exist in addition to the scalp and eyebrows of both sexes in the lateral regions of the cheeks upper lip and lower portion of the chin in males. There are no hairs on the upper eyelids the red of the lips and the inner part of the auditory passages.

The first hairs develop several months before birth. The newborn infant frequently shows a well developed downy hair covering with relatively long hairs but this disappears shortly to make room for the definite hair (Fig 1). The length of the hair increases gradually during the age of childhood and reaches its height between the twentieth and thirtieth years. From then the curve decreases resulting in a shortening of the hair length. Finally in old age the development of hair ceases entirely and baldness appears. The absolute length of the hair varies greatly. A downy hair projects from the skin surface by several millimeters while the hair of the scalp of women may reach 150 centimeters.

According to Pohl the life of scalp hair varies from about two to three years. The hair of the eyelashes lasts only for about three to five months. Young hair grows from 2 to 5 mm within ten days. Growth then becomes slower and finally before the hair falls out the increase in length is hardly noticeable. The diameter of thickness is very different. The downy hair growth of course possesses the least thickness. The hairs of the eyebrows are thicker. The hair of the beard is the strongest with a diameter of approximately 0.101 to 0.203 mm. The density of the hair varies according to its various situations. The greatest density was found by von Brunn at the parting point of the scalp with 300 to 320 hairs per square centimeter. The region of the forehead and the back of the head have from 200 to 240 hairs per square centimeter. The greatest density for the beard region was found at the chin with 44 hairs per square centimeter. There are of course variations in density dependent upon a variety of factors.

Not only among the different races but within the same race the color of the hair shows marked differences. The most frequent colors are black red blond brown and gray with many transitions and shades between these. The content of pigment is responsible for the color of

the hair. Black hair contains much dark pigment. blond hair is poorly pigmented. There is a relation in most individuals between the content of pigment of the skin and the pigment of the hair. Blonds have a fair skin while the skins of brunettes or persons with dark hair are dark.

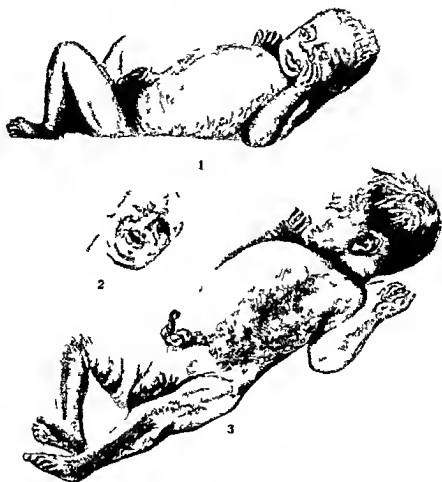


Fig 1—1 Showing hairlessness of newborn. 2 Sparseness of eyebrows of newborn. 3 Showing the downy growth on skin in relation to hair of the head. (Friedenthal.)

Albinos with an absolute lack of skin pigment have pure white hair (Fig 2)

Pathologic disturbances show premature graying. On occasion there is a lack of pigment since birth and in certain places among otherwise normally pigmented hairs white tufts may be present.

Premature graying is observed after serious illness, sorrow, and worrying. An example of historic interest is the case of Marie Antoinette who



Fig 2—Albinism

became white haired the night before her execution. Usually the development of pigment does not cease at once but its further formation is gradually stopped.

According to Trotter no difference in the number of hairs of the face was found in persons of different races. In both Negro and white women the average length and diameter of the hair of the cheeks and lip were found steadily increasing from youth to old age. The hair of

men especially in the eyebrows on the face in the nostrils as well as over the body increases long after puberty has been reached

The scalp is one of the first regions which becomes covered with primary hair growth. The length of the hair at birth reaches several centimeters. Usually it contains a considerable amount of pigment. The coarseness of the hair increases during the first years of childhood reaching about the same average diameter as that of adults. In middle life



Fig. 3—Alopecia in a woman 69 years of age (Friedenthal.)

or earlier in certain individuals the production of pigment by the follicle stops and the white hairs are usually more coarse. The cause of the relation between coarseness of the hair and grayness is not known. Usually the entire hair becomes gray and therefore it is assumed that the physiologic change in the follicle which causes the cessation of pigment production takes place when the new hair is formed. Later white hair becomes finer and at an older age frequently approaches the silky consistency of infant hair.

As age advances there is a recession of hair growth on the forehead while the zones in front of the ears at the back of the head and at the neck do not change much (Fig. 3)

The total number of scalp hairs varies seemingly in accordance with the individual hair size and pigment content. Coarse and dark hair has a smaller total number than fine light hair. According to Friedenthal Europeans of light complexion have an estimated 140 000 hairs in the scalp area those of dark color 102 000 and red haired Europeans 88 000. There are great racial differences as to the average length of the hair. In white women it is about 60 to 70 cm and grows at an average rate of about 0.4 mm per day.

A racial peculiarity is the type of hair (straight curly or kinky). Another important racial factor is represented by three different types of cross sections of the hair: elliptical, oval or circular. Pruner Bey regards these three different shapes as racial criteria for the black, white and yellow races respectively.

As stated there is a wide range of color of the hair in the white race. Children are frequently lighter haired than adults. The color is due to granular melanin and soluble red pigment. Sometimes the dark pigment is acquired later in life and therefore a child with red hair may become more or less dark haired at maturity. Generally dark hair seems to dominate the light hair and causes the color of the hair of children to become no darker than that of one parent. Rarely do light haired parents have dark haired children.

Human hair is able to take up artificial stains. The green hair of copper workers is well known. Rutherford and Hawk state that six factors influence the chemical composition of the scalp hair: viz. race, sex, age, color of hair, purity of breed and whether the sample of hair was taken during life or at the time of death. The percentages of distribution of chemical elements (sulphur, nitrogen, carbon, hydrogen and oxygen) were different for Indians, Japanese, Negroes, white adults and white children. The percentages of distribution of sulphur were found highest in white adults and lowest in Indians; nitrogen highest in white adults and lowest in white children; carbon highest in white adults and lowest in Japanese; oxygen highest in Japanese and lowest in white adults. However, it is evident that before definite conclusions can be reached adequate analyses of large numbers of cases are necessary.

The eyebrows at birth consist mostly of a downy growth. Gradually these hairs are replaced by permanent hairs. Their arrangement varies considerably in various individuals. Friedenthal estimates the number of hairs in each eyebrow at about 600 and the life span of each single hair at approximately 112 days. In later life some of the eyebrow hairs may become longer, twisted or irregularly curved, sometimes reaching a length of 6 to 8 cm. In men especially, they cause the characteristic bushy eye.

brows There is no standard as to length, width, and configuration of the eyebrows. Sometimes they continue through the middle line above the nose. The direction of the hairs of the eyebrows is outward and upward. A narrow zone literally shows the hairs pointing downward and

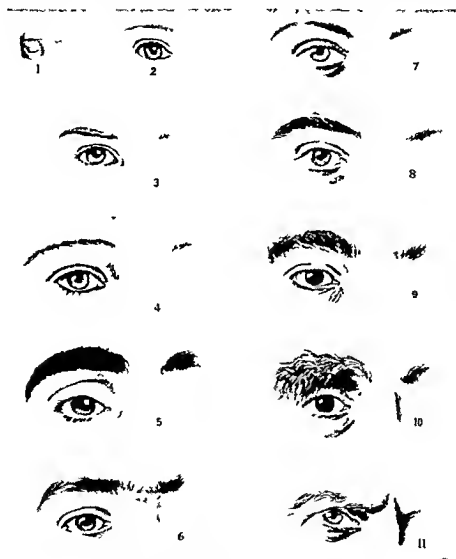


Fig. 4—Various types of eyebrows (Friedenthal)

inward; a wider zone below shows them pointing outward and upward (Fig. 4).

The *eyelashes* are more curved and longer than the brows, otherwise in structure and general appearance they are the same as the brows. They

are said to be longer in females than in males. Sometimes especially in light blonds there is a marked increase in the darkness of the eyelashes in contrast to the light color of the hair on the head. According to Friedenthal the life span of an eyelash is about 112 days with slight variations.



Fig 5-1 Eyebrows Chinese 2 beard Chinese (Friedenthal)

The hair of the beard varies considerably as to thickness and extent. Some races are characterized by an entire lack of beard growth. During the first years of childhood no sexual or racial differences are observed. At about the time of puberty some boys especially when heredity shows a tendency to a heavily bearded appearance show replacement of the down at the upper lateral corners of the lips by terminal hairs. Grad

ually progressing toward the middle line formation of a moustache takes place. The fleshy part of the chin also becomes covered with short and sometimes curly hair. Further extension of the bearded area develops from the chin and the front of the ears. There is however no terminal hair growing over a region in front of the ear of about one centimeter



Fig. 6—Bearded European swan. (Friedenthal)

in width. The final development of the beard progresses slowly and is reached only many years after puberty, and the diameter of the area covered by beard hair increases even during advanced age. A region with no terminal hairs appears frequently on the lower lip on both sides of the middle line. Few or sometimes no terminal hairs at all are found on the middle area of the cheeks. The beard is especially characteristic of the white race. Indians, Chinese, and most Negroes show little or no

beard development (Fig 5) There are, of course, great variations among the white race as to beard formation

The average length of the beard hair in white men is about 20 to 30 cm Semitic races are reported to show a higher average length Colored races produce a shorter average length Just as the hair of the scalp the hair of the beard may be straight, curly, or wavy The color of the beard does not always correspond to the color of the scalp hair There is less uniformity of color in the beard than in the scalp, sometimes blond as well as dark hairs appear simultaneously in the bearded region

While women show downy growth only at the regions of the beard of men, sometimes well developed mustaches are observed (Fig 6) Heredity and endocrine disturbances seem to play an important part here *Vibrissae*, the hairs appearing in the nostrils reach the approximate proportions of the eyelashes but often are larger, but while eyelashes end in a sharp tip the vibrissae show blunt ends They are more developed in men, especially in advanced age

Different factors influence the growth of hair The suprarenals gonads pituitary, and thyroid glands seem to play an important part here Since the glandular interactivity varies greatly (see Chapter on Endocrinology) the effect on hair growth may give rise to a variety of changes In cretins, the hair is frequently rough and scanty Following thyroidectomy, falling of the hair is usually observed In acromegaly, increased growth results Due to complicated processes and conditions not yet clarified, no definite conclusions have been reached The problem is further complicated by marked individual differences in the function of the hair follicles which varies in individuals of different races as well as in one individual in the different areas of hair on the body

The belief that cutting or shaving the hair not only produces a stimulus for growth of the hairs involved but provides a stimulus for growth of hair in neighboring parts has not been proved The observation that the beard becomes stiffer after a period of shaving is negated by the fact that the beard is naturally more downy at the time shaving is regularly started, at the age of puberty The beard of a man who never shaved may become just as stiff as the beard of the person who shaved at an early age and often Recently shaved or clipped hair appears to be stiffer because the ends of the shaved hairs are more blunt than the attenuated tips of natural growth

Certain external influences such as temperature are supposed to promote hair growth, this, however, is not definitely proved Often the Negro is quoted as an example because of the loss of his hair in the tropics On the other hand cold climate does not produce a protective

hair covering. It may be argued that this may be due to the warm clothing worn in cold regions. Observations of the effect of heat or cold on hair growth may also be related to the indirect effect upon the nervous system. An augmented supply of blood to certain areas may have a beneficial effect on hair growth. There is of course a relationship between the sympathetic and the central nervous system and the blood supply to the follicles of the hair. *hair raising* demonstrates their close relationship to emotional processes. Another factor of influence may be found in nutritional and metabolic conditions.

Canties or the graying of the hair affects all of the white race. Although numerous investigations have been made to determine what changes take place in the follicle of the hair before it becomes white the problem is not yet solved. *Heredity* seems to play a definite part. *premature grayness* is observed in certain families. *Baldness* also seems to be affected by heredity. It sometimes appears without apparent cause before the thirtieth year. Loss of hair due to old age is similar in appearance to premature baldness. Baldness of middle age *alopecia senilis*, usually commences at the cranial bones over the parietal areas. Baldness usually affects men. It seems to appear earlier and more often in brain workers than in persons doing manual labor. Hard and close fitting hats may be a factor. Baldness may appear without preceding graying of the hair. It may begin at the center of the scalp at the sides or at the temples leaving the skin smooth and without any visible change. *Graying of the hair* is observed in all humans but most frequently in Europeans and less frequently in American Indians. It is a slowly progressing process starting with the hair of the scalp later affecting the beard other hairs of the body and finally the eyebrows. There is a supposed change of hair due to replacement of the pigmented hair by hair without pigment. The sudden graying following serious psychic shocks is not yet explained but may be due to the entrance of huge amounts of air into the hair.

Some persons with brown scalp hair show, as mentioned before beards with red hair. Eyelashes and eyebrows are often darker than the hairs of the scalp. The color of the hair in its definite shade influenced by hereditary factors is reached in the races with light hair at a relatively late period or at about the end of the period of general growth some times as late as the thirtieth year of age. At birth the hair may be black and after its loss this may be replaced by light blond hair. In general however the hair becomes richer as to pigment with increasing growth which accounts for the increasing darkness of blond and brown hair after childhood.



Fig 7—1, Straight haired European, 2, slightly curly haired European, 3 and 4, curly haired European (Friedenthal)

Very light-colored hair is found principally in the northern part of Europe. The percentage of light-colored hair decreases in approaching the south. As to geographic distribution, the blond is found mostly in the east of Europe, while the yellowish brown predominates in the northwestern and northern parts. In France (Topinard) the lightest hair colors are usually found in three sections of the north of the country, and the darkest are seen in three sections of the south. Frequently, the blonds of North Africa are mentioned. They may be



Fig 8—1, Straight haired European man 2 straight haired European boy, 3, curly hair of European man 4, Wedda man (Friedenthal)

remnants of north European tribes which immigrated in prehistoric or early historic times into the northern part of Africa. Sometimes the blonds reported among the dark races of Africa or of the South Sea represent albinos or mixed breeds. Sometimes the natural color of the hair is changed by various chemical ingredients (lime, colored earth etc). Air, perspiration and sunshine produce bleaching effects at times. The water of the ocean also tends to bleach the hair.

Children of parents with different colored hair do not show mixed colors. The color of the children's hair is seldom darker than that of the darker parent but often it is lighter than the lighter coloring of the hair of their parents. There are few known exceptions to these observations on color of the hair.

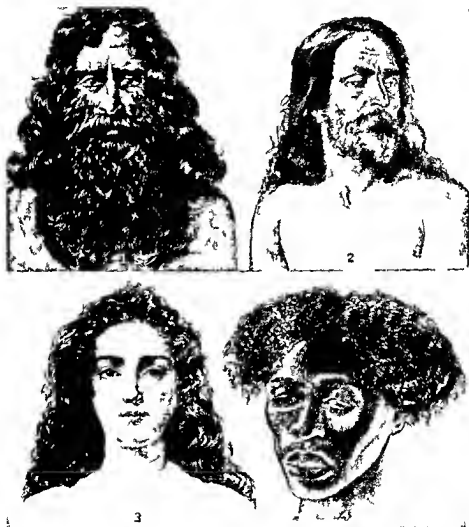


Fig 9—1 Armenian 2 Italian 3 European Jewess 4 Abyssinian (Friedenthal)

The form of the hair is of greater importance for racial differentiation than its color. Three different types may be distinguished: straight smooth hair (*lissotrichous*), wavy hair (*lymotrichous*), and woolly hair (*ulotrichous*). The first type is found in Mongols, Eskimos, Europeans, American Indians, and others; the second is characteristic in Toda, Wedda, Senoi, and Australians; the third type is seen in Negroids of

Africa Asia and the South Sea as well as in Negroes, Negritoes, and Melaneses. The most striking examples of hair curled in spirals are found among Bushmen Togo Negroes and Papuans. Some of the races



Fig. 10—1, Negro girl, Congo, 11 years of age. 2, A Togo Negro 18 years of age. 3, A 40 year-old Papuan New Guinea. Scalp hair in curly spirals. The hairs of the beard, if not artificially removed are very strong and curly. Hair growth of the eyebrows is poor. 4 Indian of South America 50 years old, has scalp hair and eyebrows, but lacks a beard. (Friedenthal.)

of the South American Indians show considerable beard growth but most of them remove it by plucking out the few hairs of the beard to accentuate the racial characteristic of poorly growing terminal hair (Figs 7, 8, 9, 10, 11, and 12).

The racial character of the form of the hair is already seen at the time of birth. Artificial treatment of the hair such as cutting oil treat

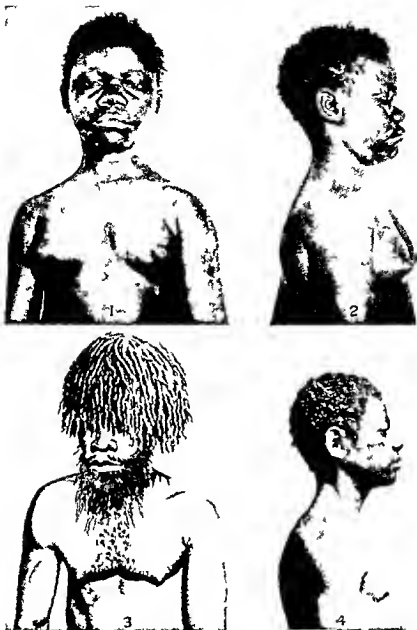


Fig. 11—1 Akka girl Central Africa 14 years old. Scalp hair shows the same characteristics as the black race. The eyebrows are poorly developed, as is the woolly terminal hair. 2 Profile of Akka girl. 3 Papuan man of 40. 4 New Irelander man of 20. Hair growth is the same as in black race. (Friedenthal)

ment and braiding may influence the form of the hair to a great extent. Other racial differences are present in the length and thickness of the hair. Great length is attained by the lissotriches and some kymotriches and is approximately the same for both sexes (Figs. 13 and 14). Sexual difference as to the length of hair, as is generally supposed to exist among



Fig. 12—Polysarcic growth of hair (Frédenthal)

Europeans certainly does not exist in West Indians Chinese East Indians etc. The average length reached by the hair if not cut is reported to be 70 cm for Europeans 75 cm for East Indians 80 cm for North American Indians and 90 to 100 cm for the Chinese. The average hair length of the kymotrichous Senoi is 30 to 35 cm for both sexes the maximum length reached by the scalp hair of the Niassa is 60 cm. The uncut hair of the ulotriches reaches a length between 8 and 20

cm only. In all races the eyelashes of the upper lid are longer than those of the lower. In Europeans they are between 8 and 12 mm long compared with a length of 6 to 8 mm for the lower lid. In Japanese the



Fig. 13—Abundant hair of a European (Friedenthal)

corresponding measurements are from 5 to 8 mm and from 3 to 7 mm respectively.

The Malaysians are among the ones with the thickest hair followed by the Japanese and Chinese.

Some favor special colors and forms of hair and the value of rarity also seems to influence judgment. A dancer of a famous European group



Fig. 14—1 Congo Negro with long beard and hair 2 blond man with long hair (Friedenthal)

reports that unfailingly the blond members of their group got the greatest applause in countries where dark hair was dominant as in the southern parts of Italy Spain etc. no matter how poor their dancing qualities were. On the other hand in the Scandinavian countries with relatively few dark haired individuals and brunettes the dark haired members of the dancing troupe had to appear again and again on the stage. In America where there is a more mixed distribution of hair color these preferences may not be so marked.

Among the pathologic conditions of the hair hypertrichosis (superfluous hair) may appear on different areas of the human body but is especially noticeable on the face in women. Many cases of *hypertrichosis lanuginosa* are cited in the literature. Of great anthropologic interest is the hairy family *Shwe Maong* of Upper Burma (Crawford) (Fig 15). It is reported that in this family the hairiness persisted through three generations affecting the father his daughter Maphoon and one of her sons. The other three daughters of *Shwe Maong* did not inherit this peculiarity neither did the older son of Maphoon. *Shwe Maong* is said to have been born of normal parents and to have been normal himself.



Fig 15—Hypertrichosis lanuginosa (Fr edenthal). 1 Boy 2 Man 3 Girl
4 Normal woman 5 Shwe Maong

at birth except for excess hair on his ears. Shortly after birth he developed the characteristic growth of hair over the body that typifies the dog man. He is reported to have been of rather superior intelligence as was Maphoon. In her case also the condition was less pronounced at birth. She gave birth to at least three children one of whom was normal and another Moungh Phoset had a more pronounced case than either his mother or grandfather.

Another interesting example of undue hairiness is presented by the Russian dog man Andrian Jestscheff of Russia and his son (Fig 16). As in the family of *Shwe Maong* a thick hairy growth covered the normally bare surfaces of the body especially the face and left only the red margin of the lips and the upper eyelids free. Jestscheff is said to have had two children a hairy daughter who died in infancy and a son Fedor who closely resembled his father. There is no evidence that he was related to the Warsaw family which produced the similar Stephan Bibrosky.

While *hypertrichosis lanuginosa* represents an atavistic characteristic *hypertrichosis vera* (*hypertrichosis terminalis* Fischer) is characterized

by loss of the primary hair covering and overdevelopment of the secondary and terminal hair growth. An example of hypertrichosis vera is given in the case of Kiao a Burmese child and another in that of Julia Pastrana. They also show a thick hair growth covering the face especially besides other parts of the body. In the case of Julia Pastrana the whiskers (beard) and mustache were completely developed and were



Fig. 16—Hypertrichosis lanuginosa. Andrian Jermineff (Tschentah)

of a deep black color. The beard was long, pointed and gorillalike. It is reported that she like other persons with a hair anomaly had abnormal tooth development e. g. a double row of teeth giving her a somewhat gorilla like appearance.

Congenital hypertrichosis is very rare as is *hypertrichosis universalis*. According to Jackson universal hypertrichosis does not affect the places where normally no hair is found. It may be either congenital or acquired and due to endocrine disturbances or dysfunction of the uterovarian apparatus.

In some cases the beard grows to an excessive length as reported by O Donovan. In one case it reached 130 inches in length. Two periods are particularly noted for the development of masculine hair in women—the age of puberty and again shortly after cessation of menstruation. Women of Latin races frequently show hair growth on the upper lip but the development of well defined beards in women is rare. In the cases reported it is often associated with excessive hair growth on other parts of the body. Usually this anomaly appears at an early age for instance between the sixth and eighth years but more frequently after the tenth year. Zenora Pastrana who is not to be confused with Julia Pastrana had a well developed beard and eyebrows of marked extent. It is reported that Mme Augéard acquired a beard at an early age and at the age of 20 a full beard had developed. Her older sister is reported to have had a similar appearance. Frau Anna Hudson is reported to have possessed a generous growth of scalp hair and a fully developed beard. The eyebrows were markedly developed. Viola M. of Pennsylvania showed a remarkable lanugo growth on the face at birth. After the loss of the lanugo at three years she showed a light blond lanugo on her cheeks. At the age of six years a mustache had appeared which reached full development at the age of 18 years. There were no reports of such abnormalities in her family and her children also were normal.

There are a variety of degrees between the extreme cases of hypertrichosis and cases which are only slightly developed. The so-called negroid type of hypertrichosis is considered to be more or less common in women of the white race the name being derived from the fact that a similar hair grouping is seen in many male Negroes. Although this type of hair growth is found in females at different ages it is more frequent after middle life. Removal of the ovaries does not seem to produce this phenomenon. It is difficult to draw a borderline between pathologic hypertrichosis of a mild degree and the physiologic form of a more or less pronounced hair development appearing on the upper lip.

Baldness (*alopecia*) may also be general or limited to special local areas it may be developed more or less and may be either congenital or acquired. In *alopecia congenita* associated with other defective developments such as tooth and nail anomalies heredity is considered to be of etiologic importance. The ratio of males to females is estimated at 2:1. *Alopecia senilis* on the other hand is characterized by a symmetrically progressive gradual thinning and loss of the hair on the vertex and at the temples. In tuberculosis *cachectic alopecia* is observed it is also seen in cases of diabetes mellitus and other diseases. Complete recovery is rarely seen.



Fig. 17—Lupus with destruction of the face

Alopecia due to *lupus erythematosus of the scalp* may extend to large areas with permanent loss of the hair (Figs 17 and 18). *Chronic inflammatory diseases of the scalp*, with resulting atrophy and loss of hair include most frequently seborrhea and seborrheic dermatitis usually young adults are affected and the condition may last for years before the loss of hair becomes apparent. The process is usually accompanied by a loss of luster of the hair, which becomes harsh and dry. Excessive



Fig 18—Lupus erythematosus of scalp (Courtesy of Dr W J O'Donovan)

oiliness is sometimes observed. The process of thinning of the hair is a very slow one and extends usually over a period of ten years or even more.

Sometimes *premature alopecia* is observed at a relatively young age. The idiopathic form starts as does *senile alopecia* at the vertex and temples in most cases extending according to Stelwagon in elliptical form

backward. Some authors blame the wearing of hats especially close fitting and stiff ones for bringing on interference with circulation followed by loss of hair. Some families seem to be more affected than others. Many conditions may be responsible for *scarring alopecia* with permanent scarring of the scalp. Among them are smallpox, impetigo, lupus, erythema, tosinus, herpes zoster, carbuncle, kerion, lupus, leprosy, congenital circumscribed alopecia, traumas produced by x-ray or radium treatments and operations. Oriental sore, alopecia cicatrizzata, morphea, and last but not least, syphilis. *Alopecia cicatrizzata (folliculitis decalvans)* as described by Quinquad (*Quinquad's disease*) shows bald patches on the scalp with a diameter of about 5 cm. with whitish centers and inflamed margins. At the mouth of the follicles are reddish pustules or papules of the size of a pinhead. There are crusting, loss of hair and extension of the bald areas at a rather slow rate. Most of the cases affect males after the fortieth year. The beard may become affected as well as the scalp.

Syphilitic alopecia is rare but may appear in all stages of syphilis. Sometimes small scars appear at sites of primary syphilitic sores on the scalp. The secondary stage may be characterized by falling of hair. Sometimes after the primary lesion begins to heal, an attack of alopecia may occur producing one or more bald spots. According to McDonagh, a maculopapular eruption of the scalp results in the syphilitic alopecia with complete loss of hair where the true papules are located.

A very rare form of syphilis, *framboesiform syphilis*, produces characteristic areas of the scalp hair multiple purulent and scabbed. The face or other parts of the body do not become involved. After treatment for syphilis, scars with permanent *alopecia areata* remain. Cases of alopecia caused by congenital syphilis are rare. Sometimes they show other stigmata of inherited syphilis such as Hutchinson's teeth. Sometimes influenza is followed by alopecia. *Alopecia areata* may affect the scalp, beard, or all hairy parts of the body including the eyebrows (Fig. 19). The latter show sharply defined bald spots. *Alopecia universalis* is rare. Sometimes the upper eyelids only are affected. The bald spots appear suddenly and are of different size and shape. Seldom is the loss of hair gradual. The bald patches extend resulting finally in wide bald areas pinkish or white usually of oval or round shape. Regrowth of hair is usually slow. It appears mostly between the tenth and thirtieth years of age in men as well as in women. The etiology of this disease is not clear. Some authors believe in a parasitic others in a neurotic cause.

Ringworm of the scalp occurs usually in childhood (*tinea capitis*, *tinea tonsurans*, *herpes tonsurans*, *tinea trichophytina capitis*). It be-

comes manifest in the form of a small scaly patch or of a red papule perforated by hair. There is slow extension of the patch followed by loss of hair. The patches coalesce and finally large involved areas develop. Beeson of Chicago found on investigation of 100 cases of ringworm of



Fig. 19—Severe alopecia areata. (McCarthy, *Diagnosis and Treatment of Diseases of the Hair*, C. V. Mosby Co. 1940)

the scalp that 89 per cent were associated with a *microsporon fungus* and only the 11 per cent remaining with a large spored fungus.

Ringworm of the beard (*tinea trichophytina barbae*) may present a superficial or a deep affection. In the former the shafts of the hairs are involved in relatively small number. The affected hairs become loose

the skin becomes reddish scaly and sometimes itching. If the deeper form is present either extending into deeper structures from the start or changing from the superficial form the lesions finally present red kerionlike tumors and become purulent or seropurulent. Sites of predilection are the cervicomaxillary folds and the under surface of the jaw.



Fig. 20—Dermatitis due to hair dye (paraphenylenediamine). Note marked photophobia and extensive eruption on forehead and neck. (McCarthy: Diagnosis and Treatment of Diseases of the Hair. C. V. Mosby Co. 1940.)

Ringworm of the beard is commoner in Europe than in America. Several organisms may be responsible for the infection. In America it is principally due to *Epidermophyton inguinale*. Sometimes animals are responsible for the infection, sometimes articles coming in direct contact with the area of the scalp, etc., such as hats, brushes, combs, or towels. Some individuals show a greater predisposition to the infection with this parasite.

After the hair has been touched up with an aniline dye, a slight degree of perspiration suffices to liberate the dye. Eruptions seem to follow (Fig. 20).

Sycosis vulgaris (*Barber's itch*) is a chronic staphylococcic infection of the upper third of the follicles of that part of the skin surface which produces long stiff hairs. The inflammation causes an eruption characterized by the appearance at the orifices of the involved follicles of papules, pustules and nodules perforated by hairs and by the formation of adjacent infiltrated areas covered by more or less crusting.

Sycosis of the upper lip is either an extension from infected follicles on the cheeks or chin or, as is more commonly the case, due to a nasal discharge.

Microsporon parasites attack the hair of the scalp very frequently. Boys are much more frequently affected than girls. In microsporiasis the entire plaque contains only a very few healthy long hairs; the alopecia is almost complete and therefore very striking even to the untrained eye of an attendant.

Pediculosis capitis is a contagious disease of the scalp due to the infestation of the hair by the common louse (*Pediculus capitis*) in contradistinction to *Pediculus pubis*. This louse never invades other regions of the body and as it has neither mandible nor mouth it does not bite. It inserts its sucker into the follicle of the scalp and sucks its food from the deeper parts of the skin. It reproduces by laying large numbers of oval shaped eggs and cements these eggs very firmly to the hairs by a chitinous secretion. It is very common in children with pediculosis to find an *impetigo* of the ears and face.

Pediculosis of the eyebrows and eyelids is always due to the pubic louse. It usually occurs as a secondary extension from pediculosis of the pubis in adults. Rarely it occurs in children and is transmitted by the infected beard of some adult who holds the child in his arms.

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CHAPTER X

THE EYE AND THE FACE

THE PART which the eye—the mirror of the soul—plays in facial expression is undecided. Magnus Henke and other physicians stress the lack of physiognomic expression of the eye itself. As a proof for it they claim that the eyes seem to lack all expression after the upper part of the face has been covered with a mask which hides everything except the eyes. Other authors *e.g.*, Lange state that the deciding influence for expression is the side of the eyeball. They illustrate this by the super-human soulful expression of the newborn infant due to the relative size of the eyes combined with the fact that infants at the age of three or four months keep their eyes wide open with the help of the *levator palpebrae*.

The eyeball of the infant is relatively larger than that of an adult. One may get an idea of the relative size of the infant's eyeball by comparison of the weight of the eyeball with the weight of the body. This ratio between the adult and the infant eye is 1:12. The cornea and iris of the newborn infant are nearly as large as those of an adult. As a rule the eye of the child changes to that of an adult by the fifteenth year of life, reaching a longitudinal diameter of 20 to 22 mm. however a wide open palpebral fissure or a protrusion of the eyeball gives the impression of size beyond proportion.

A further argument given for the ability of expression of the eye is the difference between the eyes of young and of old people which is caused by the turgor of the eyeball. This turgor or tension may remain unchanged though the remainder of the face shows the well known signs of age. Just as the turgor in the body decreases in all tissues so also is there a decrease of pressure within the eye in most people giving the eyeball the appearance of diminished size. *Arcus senilis* caused by a fatty degeneration of the cornea at the border between the cornea and sclera also plays a part in making the cornea and iris appear smaller.

In moments of strong emotion such as joy or pain the increased glow of the eye also influences expression. While increased intraocular pressure was once given as an explanation for the enlargement of the eyeball recent research has disproved it since intraocular pressure cannot rise fast enough to cause an enlargement. An increased production of tears is probably responsible for the increased glow. Decreased and increased intraocular pressure are of great pathologic importance. In diseases decrease of tissue fluid under a certain amount diminishes not

only the intraocular pressure and thereby the tension of the eyeball but also the blood contents in the surrounding fatty tissue which causes the eye to sink deeper into the orbit. Increased intraocular pressure on the other hand causes a protrusion of the eyeball as a symptom of glaucoma the dread disease which leads to the loss of sight.

A remarkable anatomic apparatus enables the eye to exercise its functions. The eye is situated approximately in the middle of the fat



Fig. 1—Normal eye (Courtesy of Dr. Peter C. Kronfeld.)

lined orbita within *Tenon's capsule*, which is a hemispheric articular capsule fastened to the bony orbita by a fascial membrane. This membrane is not entirely immobile but moves somewhat forward and backward.

The *iris*, *lens* and *ciliary muscles* form a diaphragm separating the inner eye into an anterior and posterior chamber. The anterior chamber is limited in front by the transparent highly convex *cornea*. It is filled by a clear fluid the *aqueous humor*. The posterior continuation of the cornea is formed by the less convex strong white *sclera* which forms the posterior border of the posterior chamber. The posterior part of the eye in front of the concave part of the retina is filled by the so-called *vitreous body*, a transparent jelly like mass. The *optic nerve* leaves the orbita through an opening of the posterior border of the orbita and enters the brain through the optic foramen (Fig. 1).

The *lens* situated behind the iris can be compared according to its effect to the lens of a photographic camera. It can adjust itself to objects far and near for the sake of taking photographic pictures. The power of refraction of the body increases with an increased arch of the lens. This is done by the combined action of nerves, muscles, and the elastic quality of the lens. The first two actions remain unchanged throughout life under physiologic conditions, but the power of accommodation of the lens decreases gradually with progressing age. As a result of this the point of near vision to which the eye can adjust itself by maximal accommodation moves away from the eye.

The opening in the middle of the iris, called the *pupil*, can be compared to the shutter of a camera. It dilates and contracts by muscular activity and reacts under physiologic conditions. It constricts or dilates upon light stimuli.

The *retina* may be compared to a photographic plate for the effect of the light. It covers the entire inner wall or posterior surface of the sclera in the posterior chamber. As soon as a picture reaches the retina the irritation of the rods and cones located there is transmitted to the cerebral ganglia via the optic nerve, and the picture reaches consciousness. Simultaneously the retina is ready again for the next impression of light.

The *iris* owes its name to the variety of colors in various individuals which depends on the amount of pigment. In brown irides there is much pigment; in the blue and grey iris there is no pigment. The iris is a thin circular disc of variable diameter which is suspended in aqueous humor between the cornea and lens. Special attention is often given to combinations of dark eyes and blond hair or blue eyes and dark hair. The sclerae may show slight varieties of color from bluish white to yellowish white. The yellow discoloration of pathologic nature is in jaundice or after intake of certain drugs is well known. In grey or blue irides pigmentation is often extreme, but the significance and etiology are unknown. *Depigmentation* occurs when the sympathetic nerve supply is affected. As a rule *heterochromia* occurs as a symptom complex. The brighter iris has lost its pigment. There are fine *Descemet precipitates*. In this condition cataract tends to develop early in life (*heterochromic cataract*).

Inflammations of the iris may originate in the iris or from nearby parts of the eye for instance from the cornea. These may be acute or chronic. A variety of diseases may be responsible for the inflammation such as syphilis, gonorrhea, septic infections, scrofulosis, tuberculosis, trauma, gout, and rheumatism. The appearance of the iris changes. It



Fig. 2—Conjunctival chemosis (Courtesy of Dr. Peter C. Kronfeld.)

loses its glow, becomes swollen, and the distinctness of the structure disappears, due to a more or less cloudy exudate in the anterior chamber and the irritation itself (hyperemia). Blue or grey color changes to green, dark colors assume a cloudy discoloration. The pupil is also affected by the inflammation. It is contracted, appears more grey than black with irregular margins and sluggish movements. The irregularity



Fig. 3a—Left dacryocystitis (acute) (Courtesy of Cook County Hospital Chicago)

is caused by adhesions between the posterior surface of the iris and the anterior capsule of the lens

Inflammations of the cornea manifest themselves by loss of brilliance to the surface decrease of transmission of light lessened or complete lack of transparency and new formation of blood capillaries (vascularization) The iris lids and other neighboring structures are frequently



Fig 3b—Bilateral complete leukoma of each cornea. Etiology unknown but probably postinfectious. (Courtesy of Cook County Hospital, Chicago.)

affected. The conjunctivae of the lids appear red and swollen (Figs 2 3a, and 3b).

As mentioned previously, the normal pupil reacts to increased or decreased light stimuli with contraction and dilatation respectively. It is difficult to measure the duration of the contraction during light reflex. Keefeld states that there is no normal value of sensitivity of the pupil for

the human. The reaction of the pupil may vary in spite of equal intensity of light stimuli between 1 to 4 mm. and the duration between 5 to 11 seconds.

In *anisocoria* (*unequal pupils*) one pupil is larger than the other. This may be inherited or due to another ocular condition (glaucoma, operation for cataract, trauma, subluxation of the lens) to medication (atropine, cocaine) or to an affection of the central nervous system (syphilis, meningitis, epidemic encephalitis).

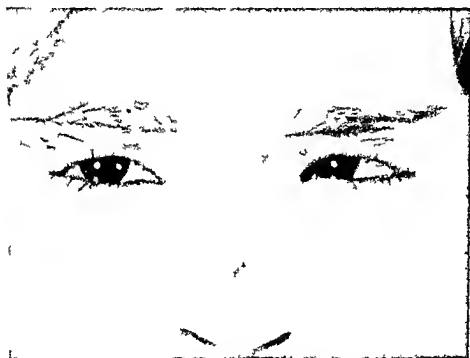


Fig. 4a—Esotropia (Courtesy of Dr. Peter C. Kronfeld)

Metasyphilis is in most cases responsible for *pathologic reactionless pupils*. Advanced chronic alcoholism may be a cause, but this type as well as the kind of reactionless pupils produced by intoxication is always bilateral; the unilateral symptom is always of syphilitic origin. Diabetes is also supposed occasionally to cause lack of pupillary reaction, which is always bilateral. Loss of reaction of the pupils occurs also in cerebrospinal syphilis and less frequently in multiple sclerosis.

Tumors of the corpora quadrigemina are responsible for a well defined type of fixed pupils, which are characterized by a bilateral vertical paralysis with inability to look upward or downward. This is of diagnostic value. Behr points out that the combination of vertical



Fig. 4b—Esotropia. (Courtesy of Dr. Peter C. Kronfeld)

paralysis with fixed pupils is characteristic of a tumor exclusively. It precludes any other disease of the corpora quadrigemina, such as inflammation, hemorrhage, or softening. Disturbances of the pupillary reflexes are also observed in combination with other anomalies of the eye, in encephalitis epidemica for example. The instability of the symptoms is remarkable. Spastic (mydriatic) fixation of the pupils is demonstrated by the fixation typical in epileptic seizures.

The action of various drugs on the pupils is well known. Some drugs such as atropine homatropine scopolamine cocaine procaine epinephrine ephedrine and others cause dilatation (*mydriasis*) while others have the opposite effect of causing *miosis*.

Six muscles control the eyeball four straight and two oblique muscles. Only one muscle originates at the anterior part of the orbita from the maxilla the *musculus obliquus inferior* the other five originate from a tendinous ring which surrounds the optic nerve at the site of its entrance to the brain. The four straight muscles (*recti*) blend with the anterior part of the eyeball the oblique muscles with the posterior part. By the contraction of the rectus muscles the eyeball is directed upward or downward to the right or to the left *rotary movements* are caused by the oblique muscles.

Strabismus is caused by an incoordination of the muscles of the eye. The two visual axes do not meet on the object. This abnormal direction of the eyes impresses the observer uncomfortably especially if he is the object observed (Figs 4a and 4b).

In *strabismus convergens* or *strabismus divergens* where paralysis occurs double images may be avoided by turning of the head to the side of the paralyzed muscle. Paralysis occurs most frequently in the *rectus lateralis* (*abducens nerve*). The patient looks from the side. In *ocular torticollis* the oblique muscles are paralyzed. The patient turns his head to the side and bends it down toward the shoulder.

The position of the eyeball within the orbit has a significant physiologic importance. Sunken eyes impress one differently from protruding eyes. The eyeball is situated in the center of the orbita as mentioned. The amount of fit within the orbita varies. Lack of fat causes the eyeball to sink back. Depositions of fat cause it to protrude. The position of the bulb may be temporary or permanent (Fig 5). The position is nevertheless not only dependent upon the amount of fat or the intake of food but may also form a hereditary race or family characteristic.

The *bulb* is kept in position by two opposing forces a protruding and retracting one each of which has various components. The main contribution to the protruding force is made by the pressure of the retrobulbar orbital contents as well as by the traction of the oblique ocular muscles. The retracting force is supplied by the traction of the four rectus muscles and by the pressure of the eyelids and orbital septum which press backward against the bulb. The change of equilibrium between these antagonistic forces changes the position of the eyeball.



Fig. 5—Enophthalmos of left eye (Courtesy of Dr. Peter C. Kronfeld.)

physiologically. The result obtained is not that which would comprise the pathologic condition of exophthalmos or enophthalmos.

Other factors influencing the position of the eyeball are enlargement or narrowing of the lid opening, position of the head and respiration. Wide-open lids as well as bending of the neck causes the eyeball to protrude. Bending of the neck is caused by gravity. If the head is kept in a bent position for a long period of time, a further protrusion of the

bulb results. According to Birsch-Hirschfeld, it is caused by a slight venous congestion. The venous congestion is a result of the orbital veins emptying into the facial and then into the cranial cavity veins. This explains also the protrusion of the bulbi on jugular pressure in the upright position. Respiration influences the position of the eyeball to a slight extent, the connecting link being the venous filling of the orbital veins, which, in turn, is influenced by respiration



Fig 6—Megalocornea (buphthalmos) on left Microcornea on right. (Courtesy of Dr. Peter C Kronfeld)

Exophthalmos may be a pseudo condition due to excess fatty deposits, buphthalmos, severe myopia, or an enlarged eye slit in cases of facial paralysis or contracture by scars (Fig. 6). Causes for true exophthalmos may be general or local (originating from the orbita or from neighboring structures) (Fig 7). Among the former are toxic diffuse (exophthalmic) goiter; states of irritation of the sympathetic nervous system; scurvy; edema, and leukemia To the latter belong increase of the intraorbital contents by various diseases, cranial injury, hemorrhage, and so on. Furthermore, paralysis of the ocular muscles and protrusion of the bony orbital walls in rickets, hydrocephalus, and other diseases may exist. Paralysis of the sympathetic nerve may cause various

disturbances oculopupillary vasomotor secretory and trophic in nature. According to Ferrieh from 90 to 100 per cent of paralyzes of the sympathetic nerve show oculopupillary disturbances.



Fig. 7—Exophthalmos (Courtesy of Dr. Peter C. Keffeld.)

The *eyelids* protect the eye against light foreign bodies etc. The upper and lower lids have essentially the same structure but only the upper lid has an active muscle to lower the lid. A cross section through the upper lid shows a cartilaginous structure the tarsus in the anterior half. Skin lines the outside conjunctiva the inside of the lid. Cilare originate on the free lid margin forming a protection against foreign

bodies. The posterior part of the lid is soft consisting of skin, fat and folded conjunctiva which makes the posterior movement of the tarsus possible. This is necessary when looking upward. A fold *sulcus palpebro orbitalis*, marks the borderline between the anterior cartilaginous and the posterior soft part of the lid. The fatty padded eyebrow ridge protrudes at this site. It is formed by the posterior soft part of the eyelid and the skin lining it to the upper orbital margin. The lines engraved here by age are distinctly visible. In the infant the fatty padded eyebrow ridge is especially prominent. Repeated opening and closing of the eye lid finally cause the development of the groove of the upper lid. The more the fat becomes compressed by the movements of the eyelids the more this groove which had been separated by only a few millimeters from the free margin of the lids at the beginning moves posteriorly. With progressive loss of fat in old age the ridge of the eyelid becomes less prominent while the cartilaginous part of the eyelid gains more distinction.

The levator of the upper lid *levator palpebrae superioris* is fastened to the cartilaginous tarsus. It takes its origin from the same tendinous circular band from which the other eye muscles also originate. The formation of wrinkles occurs much less in the lower lid than in the upper according to its decreased muscular activity.

Various influences shape the forms of the lids. The upper lid is influenced mainly by the *levator palpebrae* muscle and by the amount of fat in the eyebrow ridge. The lower lid also shows individual differences though not so marked as the upper lid because of its anatomic structure and minute muscular activity. If the eye is prominent the lower lid protrudes also. In sunken eyes the lower lid recedes.

The eyelids show signs of age very early mainly by the lack of youthful freshness and tension of the skin long before the eyeball loses its turgor and glow. Furthermore between the ages of 30 and 40 increase of body fat in general causes an increase of the retrobulbar adipose tissue. By this mechanism a primarily sunken eye may become superficial. A very adipose upper lid increases the work for the levator palpebrae muscle. In a fatty individual the eyes are usually kept half closed and give the impression of fatigue and dullness. On the other hand the general decrease of fat in old age opens up the orbit. The bony orbita becomes very prominent at the upper and lower margins. In superficially seated eyeballs the ball like bulbus protrudes markedly.

The *orbicularis oculi* muscle closes the eye. It consists of circular muscle fibers surrounding the lid opening. These fibers take their origin from the medial wall of the orbital cavity at the inner lid angle partly

at the medial wall of the orbital cavity (*crista lacrimalis* and *processus frontalis* of the maxilla) and partly from the *ligamentum palpebrale mediale*. The *orbicularis oculi* muscle consists of a peripheral orbital part which encircles the lid opening. Steady, unconscious opening and closing of the lids distributes the tear fluid regularly over the surface of the eye. The fact that the orbicular muscle contracts from the lateral to the medial side of the eye causes the lacrimal fluid to find its way into the nasolacrimal canal and thence into the nose.

During sleep the eye is closed for the exclusion of light stimuli and thus is afforded some rest. In the open eye the degree of opening seems to influence the size and shape of the eye. Various factors influence the width of the lid opening. Besides the antagonistic muscular systems of the *orbicularis* and *levator palpebrae*, the lid opening characteristically depends upon race. We observe the mongoloid slit eye, the almond shaped eyes of the Malayan, and the cover fold eyes of the Japanese. Furthermore, the intensity of light which leads to blinking, and the psychic state are factors of importance. In surprise and rage widening occurs while in laughing and in the expression of contempt a narrowing and in pain or mourning a lowering of the upper lid is seen.

The upper and lower lids meet at the lid angles. In advanced age the sharp outer angle is covered by the cover fold most of the time. The medial angle has a half moon like excoriation which opens laterally. The lid opening between these two angles measures an average of 30 mm. Often it is not entirely equal in both sides. While the lid angles have the same height in youth, the lateral angle is usually lower in old age. Blaskovitz explains this sign of age by the steady traction of the orbicularis muscle which leads to a widening of the outer lid ligament.

When in function the lower lid is depressed by gravity about 2 or 3 mm, and the upper lid is elevated by the *levator palpebrae* for 10 mm or more. The cover fold is formed as the lower part of the upper lid is drawn into the orbital cavity and at the same time is covered by the lower part. In looking straight forward the upper lid covers a small part of the corner, the lower lid barely reaches the margin of the cornea.

The height of the lid opening at its widest part is 11 to 14 mm. The lid opening of a child of two months is about twice as long as it is wide, in the grown up about three times as long as it is wide. In the child it gives the impression of being relatively higher because of the shortened length. Winking, blinking, and keeping the eyes closed are reflexes of the lids. Winking can be voluntary or may be caused by optic or other stimuli. Lid closure effected by the *orbicularis oculi* muscle is seen



Fig 8—Old woman laughing showing bilateral pseudoptosis (Lagneau 16-17 century) (From Aesculape)

in bright light coughing weeping laughing and so on Blinking is caused by a sudden nearness of an object to the eye The pupils contract with each firm lid closure In looking upward a contraction of the frontalis muscle occurs simultaneously with the elevation of the lids The expression of the face depends on the width of the palpebral fissure A strong development of fat pads underneath the eyelids may prevent wide opening of the eyes By excessive development of fat the racial peculiarity of straight palpebral fissure can be caused



Fig 9a—Ptosis (Courtesy of Dr Peter C. Kronfeld)

The upper lid shows some ptosis in old age (Fig 8). Then the frontal muscle is used to compensate for the weakness of the levator palpebrae muscle. While the frontal muscle elevates the skin of the forehead and of the eyebrows, an upward movement of the skin of the eye lids follow. The peripheral orbital part of the orbicularis oculi muscle is responsible by its contraction for the development of a typical early sign of age—*crow feet*. The loose and strongly movable skin at the lateral



Fig 9b—Ptosis (Courtesy of Dr Peter C. Kronfeld)

lid angles is pushed together in radial creases which remain when the fatty padding and the turgor decrease. A frequently performed plastic operation can restore at least temporarily the lost tension of the skin by cutting out part of the lax skin and approximating the skin margins.

A change of the palpebral fissure during childhood is caused by the retrogressive development of the epicanthus, a skin ridge which connects the inner lid angle of the upper lid with the lower lid and covers the

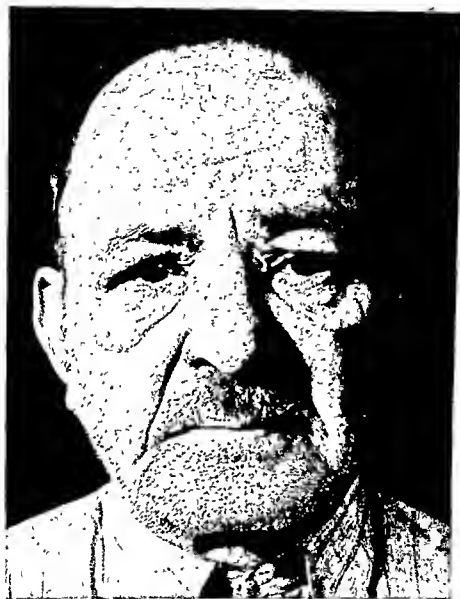


Fig. 10—Sagging lids, upper and lower. (Courtesy of Dr. Peter C. Kronfeld.)

caruncula lacrimalis. The medial transition of the upper lid to the lower lid runs in a semicircular line. In European infants the epicanthus occurs only in 33 per cent of children more than 10 years of age. On the other hand, it forms a persistent racial peculiarity of many non-European peoples, *e.g.*, the Mongolians.

Besides the aforementioned influences, a half opened palpebral fissure may be caused also by myopia, concentrated work in bright light,

and other causes. *Ptosis of the upper lid* gives the impression of fatigue or lack of interest or activity (Figs 9a, 9b, and 10). Diligence, attention, and tension cause opening of the eyes.



Fig 11—Laocöon (Vatican Rome) (From Lange)

Weeping and hugging are expressed in the eyes as well as in other parts of the face. The orbicularis oculi muscles are contracted and the eyes are partially closed in slight weeping as in children or closed entirely in intensive crying and shouting. The eyebrows are drawn down by the orbicularis muscle. Frequently, the muscle which causes the brow to wrinkle draws the inner brow ends further down than the lateral ends and at the same time moves them closer to the midline. In many cases however, the inner brow ends are displaced upward as in the Laocöon (Fig 11).



Fig. 12a—Lid abscess right eye (Courtesy of Cook County Hospital Chicago)

During laughter the eyelids tend to close. Probably instinctively children exercise a pressure upon the entire eye region by means of a contracted orbicularis as is the case during coughing or yelling. If in such cases the contraction of the muscle which closes the eye is not sufficiently vigorous hemorrhages may originate in the conjunctiva and the sclerotic tissue as well as edematous swelling of the lid and exophthalmos. In



Fig. 12b—Sloughing abscess of left upper lid. (Courtesy of Cook County Hospital, Chicago.)

the case of pathologic conditions of the lids, blepharospasm, ptosis, and *paralytic lagophthalmos* may be observed.

Hypertrophic, as well as atrophic conditions, edema, bleeding, and morbid pigmentation may change the easily shifting skin of the lids in various ways. General afflictions, or diseases of the inner cranium, or the nervous system may also do so.

Morbid associated movements of the lids with the external ocular muscles are according to Fuchs usually found in adduction and abduction of the eyelids. The lid nerve receives abnormal impulses because of a paralysis of a single ocular nerve.

We find degenerative signs at the eyelids such as *coloboma* a usually triangular circumscribed defect with the base on the lid edge and varying in depth and width *cryptophthalmos* in which the skin passes from the forehead to the cheek *symblepharon* *ankyloblepharon* *microblepharon* *distichia* and *epicanthus* are also observed.

Because of the loose structure of the epitarsal tissue each increased tissue turgor be it of general (hydremia) or local nature causes a *swelling of the lids*. The cause can be looked for in local changes of the eye and its surroundings or in general morbidity such as cardiac defects nephritis chlorosis etc. or also in nervous disturbances.

There are types of inflammatory and noninflammatory *lid edema*. The skin is reddened shining and sensitive to pressure in inflammatory lid swelling. It can be caused by circumscribed illness of the lid skin and its surroundings or of the tarsus (erysipelas tumors carbuncles infected ulcer herpes abscess inflammation of the lacrimal sac and lacrimal glands inflammation of the accessory cavities inflammation of the tarsus and others) (Figs 12a and 12b). Severe conjunctival inflammatory processes such as gonorrhea or diphtheria as well as orbital processes such as phlegmons thrombosis of the sinus cavernosus or thrombophlebitis may also lead to it.

A frequent cause for the noninflammatory edema is nephritis (Figs 18 to 21 Chap. XVI). Chronic malnutrition may produce a similar type of edema. Intestinal parasites in children may also lead to edema of the eyelids. Sometimes it can be found also in *trichinosis* as well as in anemia chlorosis vascular obstructions and diseases of the accessory cavities.

Mental moods and character peculiarities may bring about a semi closure of the lid fissure which causes the impression of dissatisfaction contempt or pride. The lid-closure in such instances occurs through a strong contraction of the orbicularis and not through a relaxation of the levator. This is proved by the early appearing wrinkles at the external angle of the eye and in the lower eyelid. In sleep when the levator relaxes no wrinkles are observed.

A ptosed upper lid is often interpreted as a sign of sensuality and as proof is given the fact that artists often represented Venus with this lowered upper lid which is conditioned by the relaxation of the levator. Also in Dionys (Rome Capitoline Museum) the lowered upper lid is

strongly stressed. It may signify sensuality, fatigue caused by drunkenness or a mixture of both.

It is quite natural that underlying temperament should find expression in the frequently absorbed activity of the palpebral levator and also in the development of the lid edges. Indifferent ocular movements of a phlegmatic person will not lead to the sharply developed lid rims of a mentally active or manic person. Occupation also exercises its influence. Scholars, artists, fine mechanics show sharper cut lid rims than do peasants or laborers whose occupations do not require a quick perception or a wide open palpebral fissure.

The movements of the eyeball also influence the palpebral fissure. If the eye is directed straight forward, the palpebral fissure assumes the shape of a softly curved oval whose upper half, if divided from the inner to the outer ocular angle by a connecting line, is larger than the lower half. The curves of upper and lower lid are approximately equal. If the eye is directed somewhat upward, the levator draws the upper lid cephalad and causes a strong flexion of the rim of the upper lid, while that of the lower lid does not change. The vertical diameter of the palpebral fissure is larger than in the first instance. If the view is directed strongly upward, a connecting line bisects the palpebral fissure from the inner to the outer palpebral angle into two entirely unequal halves, a larger upper and a smaller lower half. The upper palpebral rim becomes still more curved, the arch is flattened at the lower palpebral rim and the lower lid itself is elevated by movement of the eyeball. At the downward look, we find a relaxation of the levator and the upper lid descends. The orbicularis also relaxes and thus enables opening of the palpebral fissure downward. The height of the palpebral fissure in this case is much smaller, only about half the size, than in the moderately upward directed view.

In lateral visual direction the shape of the palpebral fissure is essentially influenced by the arching of the corner, which causes the touching part of the palpebral rim to move backward. If the eyes, for instance, are strongly directed toward the right, the palpebral fissure of the right eye is open widest in the medial third where the cornea is situated. The palpebral fissure of the left eye is open wide at the lateral side, while it appears more compressed at the medial side. The upper lid also assumes different shapes while the eye looks upward or downward. The tarsus disappears more as the bulb is directed upward. The adipose contents of the orbita also play an important rôle here. The various positions of the eyeball and shape of the palpebral fissure are affected by

accommodation as is observed for example in visual fixation at a distance of 20 to 30 cm. or looking into far distance.

Various tissue tensions effect a change of the visual direction and the configuration of the palpebral fissure. If a certain visual direction becomes habit as conditioned through some occupations the palpebral fissure may become less rigid in this form. Thus the upward and distant look of the preacher, the look of the seaman and flyer frequently blinded by sunlight, the close look of the watchmaker, all of these may create in time various characteristic palpebral fissures.

In general the eyebrows play a significant role in the expression of the face and especially of the eyes. They develop from a faint indication of a few delicate hairs in the nursing to a more or less bushy hair arch especially in men and show characteristic individual arrangement however the fundamental form of the eyebrows is conditioned by heredity.

A more or less broad stripe of the eyebrows may cover deep-lying eyes with the upper palpebral skin and the superciliary region recessed deeply in the orbital cavity. The superciliary arch of the adult measures about 1 cm. in width and 3 to 4 cm. in length. The arching is not always distinctly marked and its width is frequently uneven.

If the forehead for instance in the expression of concentrated attention is arranged in horizontal folds the eyebrows and the surrounding skin are drawn upward. This shows that the origin of the muscle which effects such contraction is situated above the region of the insertion of the hairs. It is called by some (Duchenne) the muscle of attention which consists of two symmetrical muscular bundles situated right and left under the skin of the forehead. The skin of the superciliary region can be easily shifted backward and forward because it is only loosely connected with the bone.

Some individuals are able to contract specific sections of the medial frontalis muscle. By doing so the inner superciliary end is drawn upward which lends the face the expression of intense pain. A classical example frequently quoted of this expression is that of the face of the Laocoon in the well known Vatican group. The embrace by the deadly serpents is in accord with the expression of intense physical pain (fig. 11). The heads of Christ and the Madonna often show this expression of intense pain which is represented by the updrawn superciliary segments. This is also observed in crying children. Though no explanation has as yet been offered as to the direct connection between pain and drawing up of the inner end of the brow, it is assumed that we deal here with a habit which was already observed in primitive peoples.

The *corrugator supercilii* is connected with the orbital bone and its contraction draws the inner ends of the eyebrows downward and inward. It originates closely at the root of the nose at the frontal bone whence it passes toward the middle of the brow. Its contractions shift the inner superciliary ends downward and toward the medial line; the skin is contracted and a few characteristic vertical folds form above the nasal root. They are observed in mental as well as during physical exertions. The palpebral fissure becomes automatically narrowed through the lowering of the eyebrows by the superciliary corrugator. The brows are also drawn down at the energetic closure of the palpebral fissure as in crying and weeping of nurslings.

Change in form of the usually hereditary superciliary shape is effected by the two antagonistic working muscles, the orbicularis and corrugator.

Older people sometimes show elevations of the lateral and lowering of the medial halves of the eyebrows. This originates in the lowering and drawing together of the medial half of the eyebrows through the corrugator supercilii when with advancing years the levator fails and its function is partly taken over by the orbicularis; the latter can only influence the outer superciliary half by drawing it upward; the inner half remains drawn down through the superciliary corrugator.

Anomalies of the eyebrows and eyelashes are usually observed in discolorations and loss of hairs. Sometimes falling out of the hair in the outer third of the eyebrows is observed in disturbances of the internal secretion in such instances as myxedema, diseases of the hypophysis, etc. The male and female characteristic sometimes bring about similar conditions in which the ciliary hairs do not participate; however, pre-senile canities of the eyelashes can be conditioned hereditarily or may appear in the course of nervous and mental diseases. The sudden canities or *poliosis neurotica* may be occasioned through nervous influences and is relatively frequent in ocular diseases which are accompanied by pains as for instance in severe iridocyclitis. It also appears in chronic trachoma with cicatricial changes of the eyelids after eye injuries and painful eye operations in the course of trigeminal neuralgia or migraine.

Canities or *poliosis neurotica* is frequently connected with *alopecia*.

Unilateral canities occurring in the absence of local palpebral disease may be due to trophic-neurotic causes. According to Hoffman it is mainly occasioned by endocrine disturbances (thyroid disease, hyperthyroidism as well as hypothyroidism). Atrophy or loss of the lashes and eyebrows is observed in myxedema.

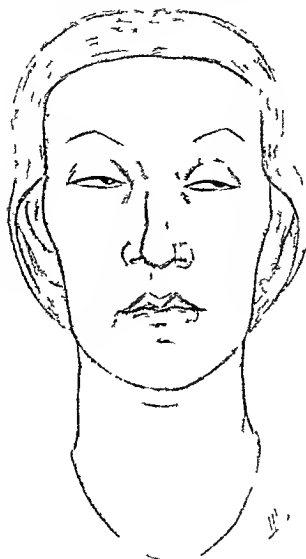


Fig. 13—*Tabes* with bilateral ptosis.

Syphilis may also be an etiologic factor. Wilbrand and Staehelin found among 200 cases of early syphilis 12 cases with alopecia of the eyebrows and seven with ciliary defects.

The eye muscles in *tabes dorsalis* (*locomotor ataxia*) are attended by numerous external eye symptoms. In this condition very slight bilateral ptosis is usually present giving the appearance of listlessness (Fig. 13). Associated with the ptosis is a paresis of the muscles of the

lower lid, which is usually of sufficient degree, although not often pronounced, to cause an epiphora from misplacement of the punctum. The extrinsic muscles are sometimes affected in tabes, giving rise to oscillations of the eyeballs, a condition which is known as *ocular ataxia*. The



Fig. 14a—Dementia paralytica with partial blindness from primary optic atrophy.

pupillary responses in tabes are characteristic, the *Argyll-Robertson pupil* almost always being present late in the disease. This phenomenon consists of a lack of reaction of the iris to light, but not to attempts at accommodation. Usually this symptom presents itself simultaneously in both eyes, although *unilateral Argyll-Robertson pupils* are sometimes seen.



Fig. 14b—Subcutaneous gumma of right temporal region. No loss of cutaneous markings. Swelling and narrowing of right palpebral fissure. Regular and provocative Wassermann reactions of blood negative. Biopsy led to diagnosis of gumma. Lesion subsided on antisyphilitic therapy. (Courtesy of Cook County Hospital, Chicago.)

The *Claude Bernard Horner syndrome* is rare and is due to a paralysis of the cervical sympathetic nerve (Figs. 15a and 15b). It is characterized by ptosis, myosis, enophthalmos, and anhidrosis. It is seen in injury of the ipsilateral cervical sympathetic ganglia or fibers.



Fig 15a—Horner's syndrome left (Note left ptosis and myosis.)



Fig. 15b—Horner's syndrome. Facial paralysis. Unilateral ptosis. Warmth of left side of face but no sweating. Dilated pupil on right side. Miosis on left.



Fig. 16a—Lymphoma. (Courtesy of Dr. Frank F. Simpson.)



Fig 16b—Linear leukoma of right cornea. Cataract of left eye (Courtesy of Cook County Hospital, Chicago)



Fig. 17—Epithelioma of right lower lid. (Courtesy of Dr. Peter C. Kronfeld.)



Fig. 18—Epithelioma of left lower lid. (Courtesy of Dr. Peter C. Kronfeld.)



Fig. 19—Bp thelioma of left lower lid (Courtesy of Cook County Hospital Chicago)

Mechanical ptosis is a variety due to increased weight of the lid (trachoma tylosis tumors etc) or lack of support (atrophy of globe and following enucleation)

In *paralysis agitans* there often may be noted a quivering of the upper lid especially when the eye is closed. *Oscillation of the eyeball* due to tremors of the straight muscles of the eye is occasionally observed



Fig 20—Basal-cell epithelioma of outer canthus (Note globular sebaceous cyst above it.)

External ophthalmoplegia is a condition in which the external branches of the oculomotor nerve are affected while the internal branches are not affected. Like *total ophthalmoplegia* it is usually of nuclear origin and is frequently in accompaniment of locomotor ataxia. The first symptom sometimes manifested in neuro-syphilis is a partial

external ophthalmoplegia involving only one rectus muscle and resulting in strabismus. Clinical evidence determines the fact that a large percentage of the palsyzes involving the orbital muscles are syphilitic in origin when they affect young persons; this does not seem to hold true in the aged.

While lymphoma is classified by some authors among the benign growths, the fact that it is composed of lymphoblasts should cause us to consider it more or less malignant (Figs 16a and 16b). It is a form of tumor rarely seen and is manifest as an hypertrophy when involving the eyelid. The mass is painful and the overlying skin tense. The condition is usually a manifestation of leukemia. The prognosis is said to be unfavorable.

Malignant tumors of the eyelids is a subject of great importance. The greater number of malignant growths which occur on the skin are of the epitheliomatous variety, though sarcoma of the skin is a condition which occasionally occurs in both the old and the young.

Prickle cell epithelioma is a rather common and frequently fatal cancer usually occurring on the lower third of the face but occasionally involving the eyelids. This growth begins in the superficial layers of the skin and is composed almost entirely of epithelial cells. It may have the appearance of a small papule in its initial stage, is slightly elevated and hard at the base. Later a slight excoriation may appear on top which may be followed by fissures which fail to heal. The growth enlarges, the skin, muscle, fatty and lymphatic tissues become involved so extensively that the patient succumbs. Metastasis is the rule in this type of epithelioma (Figs 17, 18 and 19).

The commonest type of carcinoma to be seen about the eyelids is *basal cell epithelioma* (rodent ulcer). This is now thought to originate in the hair matrix cells. These cells are smaller and more pear-shaped than the cells of other types of carcinoma. The inflammatory changes around the growth are said to be more intense than those found in the prickle-cell type of carcinoma. The growth usually makes its appearance as a nodule of much greater size than in the case of prickle-cell epithelioma. The borders are somewhat raised, there is a central area of ulceration, some secretion occurs and encrustation is present. Like all basal-cell cancers, it seldom metastasizes and is superficial. If death occurs, it is long delayed and is the result of the involvement of a large blood vessel with hemorrhage or of exhaustion. In the early stages basal-cell epithelioma of the eyelids is sometimes very difficult to diagnose, often simulating the sluggish type of *chalazion* (Figs 20 to 23).



Fig 21—Epithel oma (Courtesy of Dr Frank E Simpson)



Fig. 22—Basal cell epithelioma with invasion of orbit and destruction of eyeball.



Fig. 23—Epithelioma of left orbit (Courtesy of Dr. Peter C. Kronfeld)



Fig. 24—Glioma gliosarcoma of eye. (Courtesy of Dr. F. F. Simpson.)

There is no region of the body so predisposed to sarcoma as the *orbit* (Fig. 24). The growth here bears the same characteristics as sarcoma elsewhere but it seems to be an unusually active growth developing with rapidity not often found in sarcoma elsewhere. Sarcomas of the orbit are usually of the round-cell spindle-cell and giant-cell varieties. The first appearance of a large percentage of sarcomas is in the nasal accessory sinuses the ethmoid cells are the ones involved most often. The



Fig. 25a—B lateral chronic glaucoma. Right eye enucleated. Patient wearing prostheses. Left eye markedly reduced vision 20/200.

condition may remain unnoticed for a time but in a few weeks a sanguineous discharge develops the characteristically rapid growth of the tumor is soon followed by a beginning exophthalmos which becomes markedly noticeable. Soon thereafter the eye bulb becomes outwardly displaced the eyes are spread farther apart because of the extension of

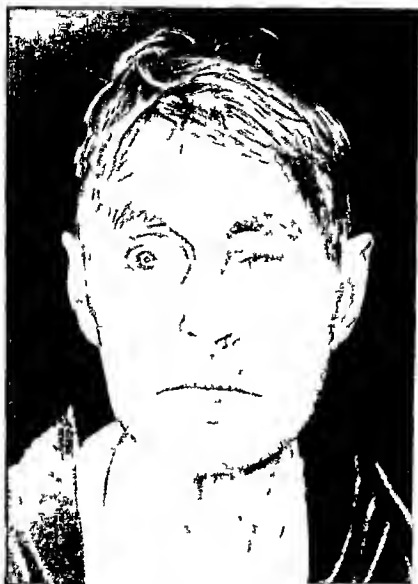


Fig. 256—Bilateral chronic glaucoma. Right eye enucleated. Patient wearing prosthesis. Left eye markedly reduced vision 20/200.

the growth in the ethmoids and the patient soon succumbs either from hemorrhage or exhaustion.

There are many varieties of glaucoma (*chronic congestive glaucoma*, *acute inflammatory glaucoma*, *chronic noninflammatory [simple] glaucoma*, *secondary glaucoma* and *infantile glaucoma*). The chronic congestive variety is characterized by a somewhat increased tension which may be present for months before the vision begins to be disturbed. The



Fig. 26—Angioma of eye (Courtesy of Dr. F. E. Simpson)

pupil is dilated and responds poorly or not at all to light. On close scrutiny the pupil is observed to have a greenish hue instead of the normal dark color. The cornea is anesthetic and may be slightly dulled in appearance or so dull as to resemble ground glass. The patient usually complains of diminishing vision which he attributes to a needed change in glasses. Sometimes there is acute pain which often is a blessing in

disguise because the patient then presents himself early enough before irreparable damage has been done (Figs 21a and 25b)

The chronic type of glaucoma is seen more often in women than in men in some Oriental races in Negroes of Brazil and in Egyptians. It is usually a disease of advanced years attacking both eyes but seldom simultaneously. The symptoms consist of attacks of obscure vision which soon disappear. This is followed by fatigue, worry or sleeplessness which is usually ascribed to a run-down condition by the patient. During the prodromal stage the patient may develop various defects in the visual field: scotomas, sector defects and narrowing of the peripheral field of which he may or may not be conscious. This stage may last for months or even years before the condition becomes acute.

The symptomatology of *acute inflammatory glaucoma* is much the same as in the chronic stage. Symptoms such as halos surrounding bright lights, occasional short periods of pain in the eye and impaired vision may occur. Lacrimation is increased and vision rapidly fails. In the average case the disease is ushered in with pain which radiates along the branches of the fifth nerve.

In *secondary glaucoma* the symptomatology is not unlike that of chronic or acute inflammatory glaucoma. It is usually associated with or is a sequel to some other pathologic condition of the eye either inflammatory or traumatic.

Infantile glaucoma fortunately is a rare disease. It is said that it may be the result of trauma. Some authors believe that inherited syphilis is a cause.

Cavernous angioma or *cavernous nevus* appears as large lobulated projecting masses. They may remain in position for long periods without hemorrhage. Usually, however, the wall ruptures and bleeding occurs upon increased effort. In children the bleeding is apt to be induced by crying or struggling. The cavernous type of nevus usually grows steadily for the first few years of life and may cause destruction of contiguous tissues during this period because of pressure in a manner similar to the action of an aneurysm (Fig. 26).

Traumatic enophthalmos is a rather rare condition and is thought by most authors to be due to a rupture of the orbital fascia or of Tenon's capsule accompanied by a paresis of the fibers of the cheek ligament. Recovery from an enophthalmos resulting from violence sometimes takes place following the subsidence of inflammatory processes within the orbit. However, the function of the eye is usually not wholly regained since the movements of the globe are restricted permanently (Fig. 27).

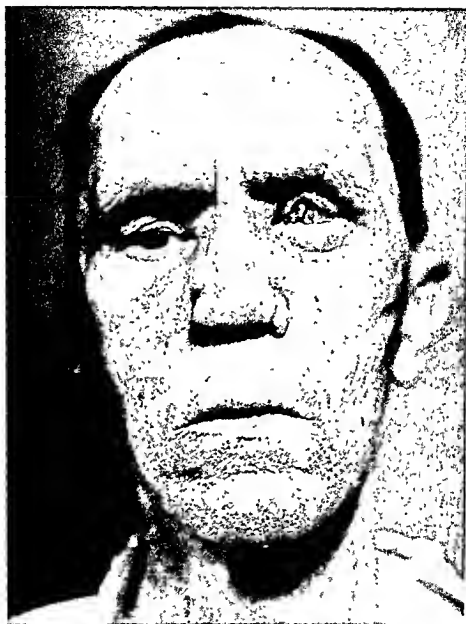


Fig. 27—Bilateral enophthalmos. Enucleation of right eye. Patient wearing prosthesis. Left eyeball is atrophic. No vision.

Trachoma is a gradual progressive hypertrophy of the conjunctiva, probably due to a specific virus, which leaves behind it more or less cicatricial tissue. It is believed that certain races are predisposed to trachoma. The Negro is practically immune to its ravages. It is unknown whether the predisposition is inherited in some races or whether it is caused by a disregard of ordinary cleanliness. The first symptoms to



Fig. 28a—Patient has active pulmonary tuberculosis. Developed an acute bilateral iridocyclitis followed by a severe tuberculous scleritis with ulceration of the conjunctiva. Diagnosis verified by biopsy.

appear are burning and smarting of the eyes. In the acute stage the disease is usually attended with persistent photophobia and pronounced lacrimation. Pains of a lancinating character may occur as soon as the cornea is involved such as is experienced with foreign bodies in the eye. Usually there is a mucous discharge which glues the eyelashes together. As the disease progresses ulceration may supervene or a *pannus* may add to the discomfort of the patient.



Fig 28b—Retinitis pigmentosa in a patient with marked impairment of vision with tubular fields

Pneumococcal conjunctivitis occurs almost always during the autumn and winter months. This condition is rarely associated with pneumonia. A nasal discharge, however, harboring the pneumococcus is often associated with it. It occurs more frequently in the young than in the adult and usually appears in endemic form. A definite diagnosis can be made only by the microscope (Fig 28a)

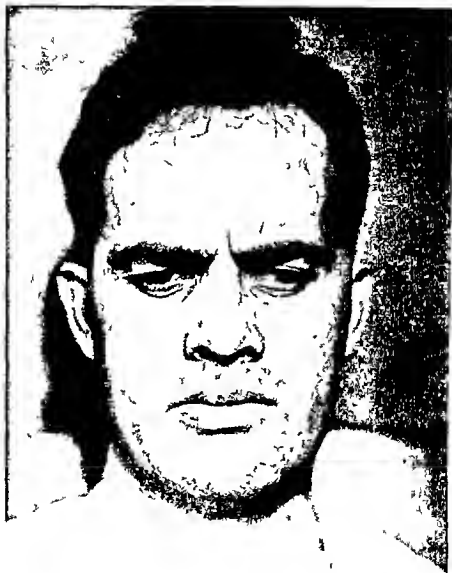


Fig. 29a—Chronic progressive bilateral uveitis. Vision reduced to light perception in both eyes



Fig. 29b—Bilateral chronic uveitis. Right eye filled with placoid exudate; vision just light perception. Left eye similar. Left vision 20/100 with correction.

Tuberculous iritis is characterized by a gradual and insidious onset, slight redness, the presence of nodules in the iris and precipitates on the Descemet membrane (Fig. 28b). It is seldom of sudden onset. The diagnosis is usually made by the presence of a positive reaction to the intradermal test for tuberculosis. *Acute iridocyclitis* (Fig. 28a) presents the picture of acute iritis with the following symptoms pointing to the involvement of the ciliary body: marked circumcorneal injection,



Fig. 30a.—Inequality of pupils. Left pupil larger than right. Cerebral tumor

tenderness in the ciliary region swelling of the upper lid, turbidity of the aqueous humor (occasionally hypopyon or hyphema) increased depth of the anterior chamber deposits upon the posterior surface of the cornea abnormal tension (increased or decreased) and greatly reduced vision (due to vitreous opacities and deposits in the pupillary space) The causative agents are the same as those of iritis The prognosis varies but it is always serious The outcome may be more or less reduced vision The disease may cause blindness with atrophy of the globe

Uveitis is ushered in with a chain of symptoms similar to those of simple iritis (Figs 29a and 29b). In addition to this besides such ophthalmoscopic changes as choroido retinitis papillitis and vitreous exu-



Fig 30b—Inequality of eyes. Note left eye congenitally smaller than right. Negro woman 27 years of age.

dates spots may be seen on the posterior surface of the cornea. The aqueous humor becomes turbid and a plastic exudate appears around the margins of the pupil ending in dense synechiae. The tension is appreciably increased. The iris becomes thick and corrugated and what appear to be newly formed blood vessels may be seen upon its surface. *Uveitis* is an inflammatory condition of the iris and ciliary body in which



Fig 31a—Cataract, right eye (Courtesy of Dr Peter C. Kronfeld)



Fig 31b—Cataract right eye (Courtesy of Dr Peter C. Kronfeld)



Fig. 32—Partial blindness from primary optic atrophy.

the vitreous contains floating spots due to an associated inflammation of the choroid.

Microphthalmos is usually a unocular congenital deformity in which the lack of development of one eye is in striking contrast to that of the other. Often the defect is so marked that the eye cannot be said to be present at all. *Megalophthalmos* is a condition in which the eye is enlarged in all diameters, with no pathologic changes apparent at birth.

It is believed that such eyes are prone to develop glaucoma later in life (Figs 30a and 30b)

A *cataract* is any opacity of the lens or of its capsule (Figs 31a and 31b) There are several varieties (*congenital, juvenile, senile, toxic, and*



Fig 33—Blind senile (Had a penetrating corneal injury and developed a sympathetic ophthalmia)

endocrine) The symptoms are diminished acuteness of vision in the incipient stage spots occasional annoying diplopia or polyopia due to irregular refraction of the lens and myopia often developing in the early stages and due to increased refractive power of the lens (Fig 32)

Perhaps the commonest *injuries of the eye* are those inflicted by small foreign bodies, such as cinders particles of sand, etc These substances

are frequently found embedded in the epithelium of the cornea. *Lacerated and incised wounds* are usually caused by an instrument or by a flying missile which cuts its way through the cornea. Occasionally a lacerating wound of the cornea is caused by a blow of such force upon

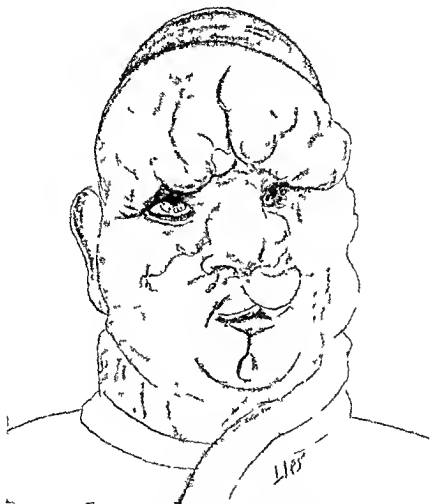


Fig. 34—keloid of face following a burn (Redrawn from Mallory, Principles of Pathological Histology.)

the eye that the cornea and usually the sclera as well is literally ruptured by the impact. *Burns* are apt to be superficial and while presenting an alarming appearance because of the coagulation of epithelium which gives the cornea a blanched appearance they are rarely of serious import since they heal quickly (Figs 34 and 35). *Quicklime and acid burns*, on the other hand are apt to be much deeper in character and tend to produce sufficient scar tissue to interfere with vision. Should

the burn be deep however, an extensive necrosis of the corneal tissue occurs which leaves a permanent scar upon healing (Figs. 36 and 37)

Xanthelasma is a skin disease characterized by deposits of fat in the skin of the lids yellowish in appearance they have a tendency to spread and are benign. Such fatty deposits may be excised for cosmetic reasons



Fig. 35—Extensive facial scarring following burn incurred when patient fell against radiator during epileptic seizure

Blepharitis in children is due to a lack of vitamin B. *Blepharitis squamosa* is characterized by reddened lid margins and scales on the eyelashes. Crusts are formed with subsequent loss of cilia in *blepharitis ulcerosa*. The condition is caused by chronic inflammation of the lids and scrofulosis.

Eczematous keratoconjunctivitis occurs in children. It is accompanied by photophobia, blepharospasm, irritation, eczema of the lids, nose and ears, phlyctenae on the conjunctival bulbi, diffuse corneal in-



Fig 36—Lysol (saponated solution of cresol) burns of both eyes. Right enucleated. Left leukoma of cornea, iritis and secondary glaucoma (Courtesy of Cook County Hospital, Chicago)



Fig. 37—Bilateral lye burns of eyes. Complete destruction of right eye which was enucleated. Patient wearing prosthesis. Left eye had a marked ectasia of the cornea on which a plastic operation was performed. Left vis on about 20/200.

filtrations and ulcers which tend to perforate. In acute *parenchymatous keratitis*, photophobia, tears and dullness of the cornea are present. The cornea never regains its normal transparency and brilliance. In these cases congenital syphilis can often be diagnosed from the aspect of the face alone. The whole face appears flat due to lack of development of the maxillary sinuses. The patient presents a dull and stupid aspect. Often Hutchinson's teeth are present.

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CHAPTER XI

THE MOUTH IN RELATION TO FACIAL EXPRESSION

OF ALL PARTS of the human face it is the mouth that plays a most important role in the expression of psychic manifestations. The relations of the mouth with reference to form, position, and surrounding areas of the face are numerous and varied. The original basic forms and development of the structures composing the mouth are predicted principally by congenital and hereditary factors; these factors, together with various muscles and psychic influences, at first establish temporary characteristics and then develop qualities which become permanent. The osseous substructure or framework on which the muscular constituents rest is primarily responsible for the form of the mouth; racial characteristics contribute to its form and appearance.

The *form of the mouth* is produced by congenital factors; may be observed at an early age. There are delicate or narrow forms as well as coarsely outlined structures which are already observed at teen age. Racial characteristics become distinctly manifest. Various habits naturally contribute greatly to the formation of the mouth. *Thumb sucking* and other peculiar habits may produce voluminous lips. Formation of the jaws and teeth, as well as the substructure, is influenced markedly by these habits. Respiration in early childhood also plays an important role in the formation of the mouth. Mouth breathing gives rise in early childhood to a dull expression. Equally, laughter and crying, which are not very marked at teen age, make their imprint in the development of the facial structure in later years. Gradually the opening of the mouth becomes laterally enlarged.

The muscles at the angle of the mouth become more active after the first year of life and retract the mouth laterally; thus the size of the mouth is determined. Upon such basis develops the so-called large or small mouth of the adult. Small mouths, as well as larger oral apertures, are constant observations. Many authors, Lange for instance, attribute the small mouths of adults to passive temperament, arguing that the mimetic musculature responsible for the expression of joy or sorrow is less active in children of such temperament. Other influences play an important rôle in the final determination in the development of the component parts of the mouth, as well as the size of the oral aperture.

The superior boundary of the mouth is composed of the roof or hard palate, the soft palate, and the 16 upper teeth rooted in the upper max-

illa and surrounded by a dense fibrous tissue—the gums. The floor of the mouth supports the tongue and its muscles the 16 inferior teeth and their gums.

The superior maxillary bones (two) located on both sides of the center of the face are of irregular shape. The palate bones (two) immediately posterior to the maxillæ form together with them the hard palate. The mandible or lower jaw bone is the strongest and heaviest of the head bones; it supports the inferior teeth and also is the osseous framework of the floor of the mouth. It is generally symmetrical in shape. The lines forming the facial angle influence the occlusion of the teeth. In the nervous and bilious types of individual the occlusion is according to Broomell usually firm and well locked, the dip to the arch prominent and the articular movements slight during mastication. In individuals of sanguine and lymphatic temperament the occlusion is loose and the over bite short, thus permitting more freedom of movement.

The buccal orifice is transverse in direction and is limited by the angles of the mouth. The upper lip is usually shaped in the form of a double curve forming a small tent in the center; the lower lip represents a single curve between the two corners of the mouth. There are thick and fleshy lips strongly curved but slightly separated from the teeth and from each other when at rest. Other lips are thin with straighter contours pressed more tightly against the teeth and placed closely together during rest. There are various transitions between these extremes and many other variable features such as more or less flexibility of the muscular apparatus, difference in color, etc. (Figs 1 2 3 4 and 5).

The lips are covered externally by integument and internally by mucous membrane; its beginning is marked in healthy individuals by a natural more or less bright red color; this covering is very sensitive and contains a number of vascular papillæ and numerous nerve terminals. The various muscles of the lips are attached to the maxillary bones. The integument or external covering of the lips is similar to the skin of other body parts. It is characterized in the male by a peculiar change of its outer layer resulting in the production of a hairy growth.

The muscles of the lips are the orbicularis oris, the levator labii superioris alaeque nasi, levator labii superioris, depressor labii inferioris or quadratus menti and zygomaticus minor. The actions of the orbicularis oris are manifold. It brings the lips to a close, drawing the upper lips downward and the lower upward; it draws the corners of the mouth together, projects the lips forward and backward against the teeth. It also opposes the functions of all other muscles that blend with it. The levator labii superioris alaeque nasi by its shorter smaller portion

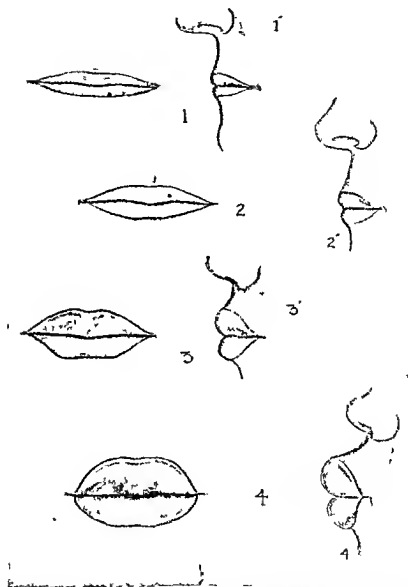


Fig. 1—Diagrammatic representation of the development of the mucous membrane of the lip by equal width of the oral aperture. 1 1', thin, 2 2', medium, 3-3', thick, 4-4', voluminous (After Rudolf Martin *Lehr d. Anthrop.* Fischer, Jena 1928)

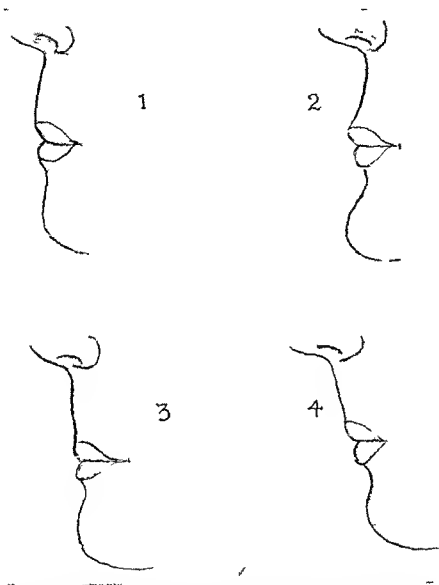


Fig 2—Diagram of integumental contour of the upper lip in profile at various developmental levels (Medium) 1, Convex. 2, Concave 3, Straight. 4, Receding (After Rudolf Martin, Lehr d. Anthrop Fischer, Jena 1928)

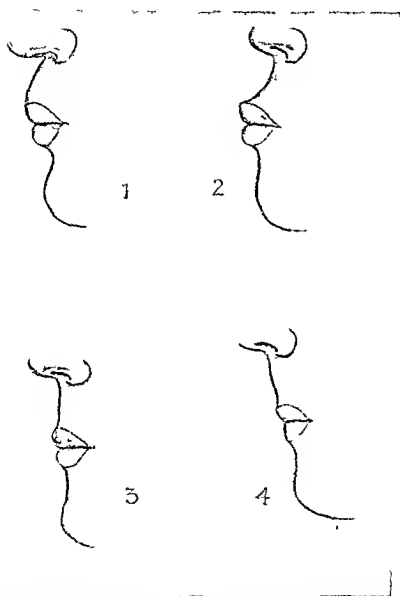


Fig 3—Diagram of integumental contour of the upper lip in profile at various developmental levels. (High) 1, Convex 2, Concave 3, Straight. 4, Receding (After Rudolf Martin, *Lehr d. Anthrop*)

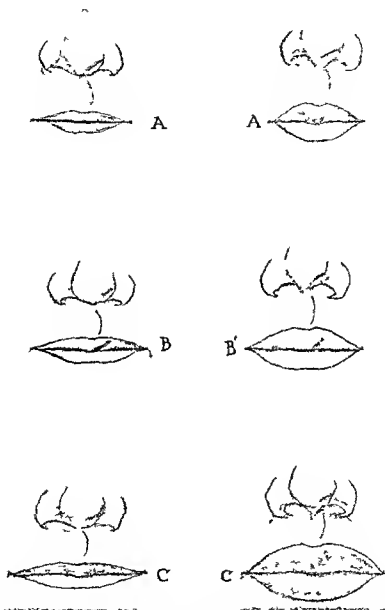


Fig 4—Diagrammatic representation of the width of the oral aperture as related to the various heights of the mucous membrane of the lip A A, narrow, B B', medium, C C', wide (After Rudolf Martin, *Lehrb d Anthrop Fischer, Jena, 1928*)

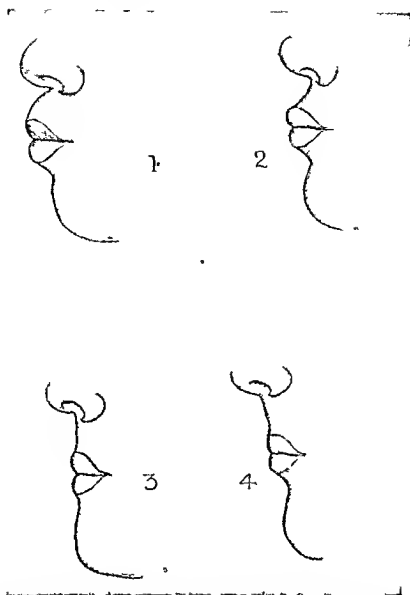


Fig. 5.—Diagram of integumental contour of the upper lip in profile at various developmental levels (Low) 1, Convex. 2, Concave 3, Straight. 4, Receding (After Rudolf Martin, *Lehr d. Anthrop. Fischer, Jena, 1928*)

dilates the nostrils and raises the wings of the nose, by its longer, larger segment the inner half of the upper lip is elevated. The *levator labii superioris* elevates the upper lip the *depressor labii inferioris* draws down and to some extent everts the upper part of the lip.

The *muscles of the cheeks* also influence the mouth. The *buccinator*, a thin flat muscle, deriving its name from its function, that of being the main muscle used by the trumpeter, draws the angles of the

Thick and high lips do not only bespeak individuality but indicate race or racial mixtures. Ordinarily the upper lip is somewhat protruding as compared with the lower lip but on occasion the opposite holds true. In the newborn one may observe an inner and outer lip zone. The inner zone or the mucous membrane portion measures about 1 mm in the upper lip and 3 mm in the lower. The outer zone or the red of the lip is about 2 mm deep. Ordinarily this condition recedes during adolescence. If it while

precisely the same as the lower lip. On the upper lip to rest upon the lower lip. The measures in adults about 1 or 2 mm may play an important role in the forcible contraction of the orbicular aperture to become shortened lips provide this form of introduction of various sounds (kiss)

mouth ascend while in depressed state constitutes the basic difference between the happy and depressed frame of the mouth aperture is in a state of relaxation of the trianguliformis muscle les of the mouth characterized by the mouth outward. All items of the first year of life. Another it in the so-called nasolabial fold the mouth occurs

mus and

gate of the mouth

of respiration. The mouth outward and displacement of the labials the so-called

clatrum to the face

as muscles the caninus assist in whistling and inward and externally upward but also laterally of the upper lip (*quadratus*) or a combination of the

Thick and high lips do not only bespeak individuality but indicate race or racial mixtures. Ordinarily the upper lip is somewhat protruding as compared with the lower lip but on occasion the opposite holds true. In the newborn one may observe an inner and outer lip zone. The inner zone or the mucous membrane portion measures about 4 mm in the upper lip and 3 mm in the lower. The outer zone or the red of the lip is about 2 mm deep. Ordinarily this condition recedes during adolescence. If it continues the so-called double lip results (Fig. 6).

While during the contraction of the *orbicularis oris* the mouth is closed pressure contraction causes the upper lip to rest upon the lower lip. Under these conditions the oral aperture measures in adults about 4 or 5 cm. The difference of one centimeter may play an important role in the impression created by the individual. Forceful contraction of the *orbicularis* may cause the diameter of the oral aperture to become shortened to 3 cm. Under such circumstances the lips protrude; this form of movement is particularly manifest in the production of various sounds (kissing, whistling, etc.).

In joyful states the angles of the mouth ascend while in depressed mental states they descend. This appearance constitutes the basic difference of the visual appearance between a happy and depressed frame of mind. While the contraction of the oral aperture is in a state of rest it becomes curved upward through the action of the *triangularis muscle*. Such action may produce folds at the angles of the mouth characterized by a short fold extending from the angle of the mouth outward. Ill-tempered children display this line as early as the first year of life. Another effect of the *triangularis* muscle may result in the so-called *nasolabial fold* (*nasolabial curve*). The typical fold of the angle of the mouth occasioned by the action of the *triangularis* muscle when continuous and constantly subjected to the lateral retraction of the angle of the mouth becomes a permanent factor causing the impression of resignation. The action of the *risorius* which pulls the angle of the mouth outward and somewhat upward is accompanied by a simultaneous displacement of the lower end of the nasolabial groove. In some individuals the so-called dimple develops from smiling imparting a certain charm to the face particularly in women.

The fairly superficial actions of the *zygomaticus* muscles, the *caninus* and *levator anguli oris* muscles are deeper and assist in whistling and kissing. Their fibers run diagonally from above inward and externally and thus pull the angle of the mouth not only upward but also laterally in cases of wide oral apertures. The elevator of the upper lip (*quadratus labii superioris*) is composed of three divisions or a combination of the

levator labii superioris *levator labii alaeque nasi* and *zygomaticus minor*. One segment originates at the back of the nose in the region of the inner angle of the lid (*caput angulare*) the second part springs from under the bony border of the orbit immediately above the foramen *infra orbitale* (*caput infra orbitale*) and the third segment takes origin from the *zygomaticus* (*caput zygomaticum*). The three components form a muscular body which radiates toward the upper lip extending almost to the midline.

Mild contraction of the *quadratus labii superioris* causes the upper lip to become slightly elevated and naturally protruded so that more of the vermillion part of the lip becomes visible than is the case when



Fig 7—Shape of the mouth in Japanese Negro and European (From Fr edenthal)

the upper lip is at rest. A classical example of this expression is displayed by the David of Michelangelo (see Fig 97a Chap V). A careful study of this expression shows that during muscular action the upper lip appears wider as compared with the lower lip. Crying in children begins with an elevation of the upper lip. Physical and psychic pain is characterized by the elevation of the upper lip due to the contraction of the *quadratus*. Marked contraction is noted in violent crying spells may cause the upper lip to be pulled so violently upward as to expose the upper gum.

The *quadratus* (especially its upper third located next to the nose) influences the *nasolabial curve* the *alae nasi* contract simultaneously. Thus the *quadratus* is not only concerned with crying but takes part in such expressions as hate dissatisfaction and general unhappiness. Also during violent laughter it is combined with the muscles concerned in laughing.

The *buccinator* becomes active when the angles of the mouth are retracted outward. This is exemplified in such expressions as displayed by self-control self-consciousness embitterment and resignation. Lange

terms the restrained smile is the salesman's smile or the smile of a flunky. The expression of submission or subservience is particularly characterized in such facial expressions as seen with bowed head and downcast eyes. On the other hand the cheeks and lips may express disinclination and arrogance.

While in the laughter of children the action of the *risorius* and *zygomaticus* play an important role the smile of the adult is occasioned particularly by the action of the *buccinator*. Such action is also observed in crying while the angles of the mouth are displaced outward. It influences particularly the lower third of the nasolabial fold which is situated closely to the angle of the mouth. During hearty laughter while the angle of the mouth is rolled outward the muscle does not participate in displacing the angle upward. Marked convex lines are seen on both sides of the nose and mouth running toward the ears. Because of its position and wide origin near the ears the *buccinator* is also capable of compressing portions of the lips against the teeth thus arises the characteristic facial expression known as clenched teeth or grinding of the teeth. A compressed position of part of the mouth against the teeth imparts such expressions as resignation, restraint or tension.

The groove between the nose and mouth so-called nasolabial groove which plays so important a role in the expression of the face is influenced by the *triangularis* and *buccinator* muscles as well as other muscles such as the *quadratus labii superioris* which acts upon the angle of the mouth the upper lip and *alae nasi*. The contraction of the nasolabial fold depends upon the muscles which participate in its formation (*quadratus labii superioris*, *zygomaticus* and *buccinator* which displace the angle of the mouth upward or outward).

Underneath the skin of the region of the mouth and mandible powerful muscles are situated. These are poor in fat and the lines of age are as a rule not marked in this location. An exception is the angles of the mouth which usually remain more prominent.

Senility becomes manifest because of the loss of teeth. When these are lost retrogressive changes take place in the mandible which in turn may give rise to a diminution in the size of the skull in other words a reversion to the infantile type (Fig. 8). The protrusion of the chin is particularly characteristic in the toothless face of the aged.

The action of the muscles producing laughter (*zygomaticus risorius* and in part the *buccinator*) is responsible for the production of the more or less soft arching of the structures concerned with smiling which is characterized by an ascent in the angles of the mouth. The *levator labii superioris* may also play a part in this expression and also in the

exposure of the teeth. In hearty laughter when the *risorius* and *zygomatikus* are at work the angles of the mouth are also displaced markedly outward while the nasolabial folds conform in a semi arch fashion to an imaginary line running from right to left. The nasolabial folds may



Fig. 8—Chart showing the evolution and degeneracy of the mandible (From Broomell)

also assume an arched form and create a more or less straight line across producing a rhomboid area on both sides of the *alae nasi*, crossing the angles of the mouth upward and from there advancing downward to the median line of the mandible. This is the case when the oral aperture is violently retracted by the *buccinator* and when the skin is of high resistance.

For convenience one may describe two groups of muscles of the mouth which are responsible for emotional expressions. The first protrudes the lips thus separating them from the teeth and exerting the lip; the second group depresses the angle of the mouth or may elevate or retract it outward.

If the peripheral fibers of the orbicularis contract moderately the angles of the mouth are compressed and the lips arch giving rise to the stern thoughtful expression. The expression of threat results from the



Fig. 9—Expression of sulking (From Hrukenberg)

stronger compression of the lips and the protruding of the lower lip by means of the mentalis. If the *quadratus labii inferioris* arches at the same time the threat expression is intensified. Between all these facial expressions there naturally are various transitions, accentuations, discriminations or perhaps only the slightest indications of such expressions. For example the observer unconsciously registers as fast as lightning the slight contractions of the angles of the mouth as they come and go in the face of another person. The unlimited number of oral pictures to be observed in everyday life is entwined not only with heredity and the construction of the osseous as well as the soft parts but also with the instant transformation through the different muscular movements which again are intimately connected with emotions, moods, disposition. *Charakteranlage* etc. This emotional influence may be observed even in the newborn. The sensation of pain makes the infant close his eyes and cry, soon frowning of the forehead is noticed. A characteristic trait of early childhood is the drawing down of the angles of the mouth especially

before crying; this becomes manifest about the eighteenth week. Beginning at the eighth month the mouth droops during crying and assumes a marked quadrangular shape. The expression of sulking occasioned by protrusion of the lips is observed in the second year of life (Fig. 9).

There is a marked connection between taste and expression in the nursing. The newborn shows special reactions to different taste sensa



Fig. 10—Hemangioma of the lip (Courtesy of Dr S. G. Balkis)

tions. Sweets, such as sugar, cause sucking movements. Bitter substances cause the infant to close his eyes tightly and to open his mouth widely. However, the strict regularity of association is still missing.

Expressions of attention may be displayed in the child by protruding and pursing of the lips. A characteristic of the expression of sulking is the outward turning of the red portion of the lip; with the expression of indignation it is turned inward. As early as the second week the expression of astonishment may be observed in a child. This is manifested in staring with open mouth, drooping of the lower jaw, immovable

widely opened eyes and motionless attitude. Astonishment is also expressed in the adult by a wide open mouth.

In a state of fright the muscles about the mouth appear lax, the maxilla is also relaxed while the mouth and nasolabial fold are widely open. If the masticatory muscles are affected the well known chattering



Fig. 11.—Hemangioma of the upper lip (Courtesy of Dr. S. G. Balkin.)

of the teeth occurs. In sudden or extreme onset of fear these symptoms increase to convulsions of some muscles especially at the angles of the mouth while the distorted face usually assumes the color of deadly pallor. In the so-called diabolical laugh the maxillae are pressed together and a peculiar contraction of the muscles concerned is observed. During *severe physical pain* as well as in the state of wrath the lips and teeth are tightly pressed together. Biting of the lips is often displayed in attempts to suppress physical pain. In yawning the mouth is slowly opened during deep inhalation the tongue falls backward and expiration follows.



Fig 12—Angioma of lower lip (Courtesy of Dr F E Simpson)



Fig 13—Hemangioma (cavernous) of lower lip (Courtesy of Dr S. G Balkin)



Fig. 14—Lymphangiomatosis (Courtesy of Dr. V. H. Kazanjian.)

It is a forced sort of inhalation occasioned by fatigue, loss of blood, etc. In *suppressed yawning* the maxillae open only partly while the opening of the mouth is almost completely suppressed.

The special position of the lips in *kissing* has often been discussed. Lange asserts that the question "Why do human beings kiss each other?" was for him an unsolved problem until he observed the orangutans in the zoo. When they noticed bananas in order to reach the delicacy they protruded their lips into the kissing position. This, Lange asserts, gave him his answer. The arching and puckering of the lips, as previously

mentioned is observed in the nursing particularly when the sucking position of the lips is manifested with pleasant associations and moods. The mouth is richly supplied with nerves and is an extremely sensitive part of the face.

As numerous as is the variety of normal mouths so also are the manifold pathologic forms or diseases of the lips and oral appendages. Tumors of the lips may cause severe disfigurements of the face. *Hemangiomas*



Fig 15—Macrocheilia (Courtesy of Dr V H Kazanjian)

appear on the lips and on the mucous membrane of the oral cavity. A *hemangioma* may manifest itself in a variety of forms (Figs 10, 11, and 12). The simple *hemangioma* (*hemangioma simplex*) and the *cavernous hemangioma* (*hemangioma cavernosum*) (Fig 13) predominate while the *hemangioma arteriale racemosum* is seldom seen on the lips, oral cavity, and tongue. The *hemangioma simplex* appears mostly at birth or soon thereafter and is due to embryonic disturbances. Angiomas may affect the entire extent of the upper lip. The *hemangioma cavernosum* makes its appearance later and is of slower growth. It is a bluish color and has the characteristic peculiarity of disappearing upon pressure.



Fig 16—Macromeriosis (Courtesy of Dr. Lester Hollander)



Fig. 17—Macrocheilia due to vascular nevus (Courtesy of Dr. Lester Hollander)



Fig. 18—Macroglossia. (From Westmoreland.)



Fig 19a—Granuloma pyogenicum of lip (Courtesy of Dr Lester Hollander)



Fig. 19b—Granuloma pyogenicum of lip. (Courtesy of Dr. Lester Hollander)

Lymphatic angiomas affect by preference the upper and lower lips as well as the tongue (Fig. 14). They lead to *macrocheilia* (enlargement of the lips) and *macroglossia* (enlargement of the tongue). *Macrocheilia* may thicken and enlarge the lips three to five times their normal size (Figs. 15, 16 and 17). *Macroglossia* may make its appearance at birth; at first, only a portion of the tongue is affected (Fig. 18). When the tumor increases, the entire oral cavity may be filled out by the enor-



Fig. 20—Smoker's burn ("precancerous"). (Courtesy of Dr. S. G. Balkin.)

mously enlarged tongue, which may finally hang out of the mouth (*prolapsus linguae*). Diseases which may lead to macroglossia are *muscular hypertrophy*, *neuro-fibromatosis*, *acromegaly*, *syphilis*, and other conditions such as tumors (*sarcomas*), etc.

Lipomas are only rarely found on the lips and in the mouth. They may attack the skin as well as the mucous membrane of the lips. Fibromas appear on the lips, especially as soft, wartlike formations (Figs. 19a, and 19b). From minute size they may assume in the course of years the size of a bean. The covering skin is either normal or shows pigmentation and hair growth. *Papillomas* appear mostly in advanced years in the form of small, wartlike tumors on the skin of the lips.



Fig. 21—Carcinoma of upper lip resembling syphilis. (Courtesy of Dr. Lester Hollander)



Fig 22a—Carcinoma of upper lip before treatment with x rays
(Courtesy of Dr Lester Hollander)



Fig. 226—Carcinoma of upper lip after treatment with x rays.
(Courtesy of Dr. Lester Hollander)



Fig. 23a—Carcinoma of upper lip (Courtesy of Dr. Lester Hollander)



Fig. 23b—Same patient as in Fig. 23a showing involution after intraoral x ray treatment (Courtesy of Dr. Lester Hollander)

Sarcomas and other malignant tumors may attack the lips tongue and cheek (Figs 20 21 22a and 22b 23a and 23b)

Not only because of its frequency especially in advanced years but above all because of its malignant tendencies prompt therapy should be instituted in all forms of cancer of the lips eyes and maxilla According to Bormann of all cases of facial carcinoma 45.6 per cent appeared on the lower lip 91.4 per cent of these were found in males Carcinoma



Fig 24—Unusual type of carcinoma of the lower lip (Courtesy of Dr Lester Hollander)

of the lips ordinarily originates in the lateral portion of the lip The ratio between lower and upper labial carcinoma is between 1.10 and 1.5 (Figs 24 and 25)

Harelip belongs to the most frequent malformations of the lip

Congenital fistulae of the lower lip which may cause diagnostic difficulties are very rare They are associated with harelips as well as perfectly normal lips and have at times been known to occur in several members of the same family They are usually symmetrical bilateral and about one centimeter away from the dividing line they form very delicate passages up to about one centimeter in depth



Fig. 25—Epithelioma of lip (Courtesy of Dr. Lester Hollander)

The causes of congenital defects of the lips and palate harelip and cleft unilateral or bilateral are in the main occasioned by heredity metabolic aberrations pathologic influences upon the female generative



Fig. 26—Congenital harelip before and after operation (Courtesy of Dr J B Schaefer)

organs thus affecting the ovum and consanguinity the latter is evident in a number of cases of infants from closely related intermarriage

The outer mucous membrane of the lips is especially exposed to mechanical injuries By *cheilitis* are designated the acute and chronically inflamed processes affecting the lips (Figs 27 and 28) *Acute cheilitis* is due to trauma (e g by a pencil a toothbrush or toast) *Herpes labialis* *syccosis* *eczema* of the labial surface may occasionally



Fig. 27—Cheilitis of undetermined origin not due to the ordinary contact irritants such as tooth paste or lipstick. (Courtesy of Dr. Lester Hollander.)



Fig. 28—Traumatic ulcer of lip and gingiva. (Courtesy of Dr. S. G. Balkin.)

cause circumscribed and diffuse inflammatory conditions (furuncle or carbuncle) these are most frequently seen on the upper lip. The edematous red distorted appearance of the affected lip once seen is seldom forgotten. Labial abscess may resemble furuncle and must be distinguished from it.

The influence of linguistic articulation on the shape of the mouth should be noted. Vowels are the result of sounds and tones produced in the oral and nasal cavities in conjunction with the vibrations of the vocal cords. This is accompanied by characteristic oral and labial movements which are especially noticeable in whispering. A definite configuration of the components of the oral cavity corresponds to each vowel which may also be recognized visually by observing the position of the lips which change in attitude with each individual vowel. The labial sounds are especially characteristic of consonants. These facts make 'lip reading' possible. Language influences the shape and structure of the lips. *Speech defects*, including *stuttering* and *stammering* are caused by malformations of the hard and soft palate, deaf mutism, nasal defects, diseases of the central nervous system, etc.

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CHAPTER XII

THE TEETH AND THE FACE

THE FIXED FEATURES of the human face which remain uninfluenced by the will depend mainly upon the shape of the bones, teeth, and soft parts. The different human races show radical differences in regard to osseous and soft tissue structures. For example, the native Australian shows characteristic peculiarities of the original human facial shape. In contrast to the small development of the cranium stands the stressed development of the maxilla and the set of the teeth, besides other features such as the narrow, low forehead, and notable protrusion of the zygomatic and malar bones. The strong development of the maxillae and the set of the teeth are related to the intensive preparation of the food which requires greater work of the masticatory organs, for not only the muscles, but the bones as well, regress in size and strength if not in use, while they develop strongly when used intensively.

In the Negro the cranium is still less developed and Camper's angle (bounded by the connecting link of the nasal spine and opening of the auditory meatus on one hand, and the anterior surface of the forehead and the edge of the incisor teeth on the other hand) is much smaller than in the Europeans. The jaws protrude prominently.

In Mongolians the cranium is more developed than the facial portion of the skull. While their zygomatic bones are strikingly apart and very high, the jaws protrude but little. The cranium of the Caucasian in contrast to the facial portion of his skull is especially well developed. The zygomatic bones no longer extend in width beyond the forehead, and the jaws no longer protrude and his Camper's angle is larger (from 75 to 80 degrees) than that of the Negro (60 to 70 degrees) or of the manlike ape (40 to 50 degrees).

Racial peculiarities are not particularly manifest in the newborn. The cranium is much larger in proportion to the facial portion of the skull. Essentially, the brain is already developed in the newborn, while the teeth are still invisible. A distinct increase of the facial portion of the skull is coincident with the development of the jaws and the *milk teeth* in the first year of life. Only when the permanent teeth develop (between the sixth and eighth years) does the facial development approach the adult shape. With the stronger development of the jaws, the axis of the face becomes more longitudinal. Between the thirteenth and fifteenth years the facial portion of the skull develops further in proportion to the development of the jaws and teeth.

With the advent of old age the jaws recede again and the facial portion of the skull again becomes smaller approaching the shape of the child's skull this is accompanied by the falling out of the teeth. A chin directed upward and an apparent sinking of the top of the nose are characteristic of the toothless face of senility. In primitive races these characteristics of old age are but little marked this because of the long life of the teeth. Consistent exercise plays an important role here.

As in the other parts of the human face there are differences in the teeth observed in both sexes. The upper middle incisors form a striking example they are not only relatively but absolutely broader in the male than in the female not only in Europeans but also in other races. The lower jaw is smaller and more delicate in woman than in man. This together with the broadening of the orbital areas and the broadening of the upper incisors lends the woman a softer rounding of the features in contrast to the male face.

The width of the labial margin is influenced by the development of the teeth. When the teeth are lost the labial margins turn inward. Thus the closure of the jaws makes the lips appear larger.

The lower mesial prominence of the lower jaw is covered by the structures of the chin. The chin is dependent on the development of the mandible and is characteristic for the human being in contrast to the animal. It is but little developed in the Negro with his snoutlike protruding mouth. In emaciation and cachexias the contours of the bone of the lower jaw are visible at the chin.

Two kinds of teeth are distinguished in man the *milk teeth* and the *permanent teeth*. The former 20 in number develop during the first three years of life. The 32 permanent teeth begin to develop from the seventh year on.

The shape and development of the jaws are dependent on the teeth. The milk teeth are cut between the sixth and thirtieth months of life and are smaller and more tender than the permanent teeth. They consist of two *incisors* on each side and one *canine* tooth two *bicuspid* teeth and three *molar* teeth. The parts of the teeth projecting above the gums are the so called *crowns of teeth*. The tooth surfaces which face the lips are almost quadrangular and usually have three rounded prongs in freshly cut teeth. The upper and middle incisor is largest. Next in size are the upper lateral and then the lower lateral incisor while the lower middle is smallest. The upper middle teeth of women are not only a little larger but in general protrude somewhat more than those of men. The lower margins of the canine teeth are longer and stronger

than those of the incisor teeth. The crowns of the lower canine teeth are longer and narrower than those of the upper teeth.

The *bicuspid teeth* are characterized by quadrangular irregularly shaped masticatory surfaces. The molars are more strongly developed than the bicuspid teeth with dice shaped crowns. The *third molar tooth* the *wisdom tooth* which cuts later than the others is frequently imperfectly developed and is often lost early because of disease.

The canine teeth are situated behind the angles of the mouth. The corresponding teeth of the upper and lower jaw do not meet in biting because of differences of configuration size etc. of the upper and lower jaws. The longitudinal axes of the upper teeth are directed outward and are somewhat obliquely below. It is for that reason that the upper teeth protrude a little laterally above the lower whose longitudinal axes are directed a bit inward and upward. The point of the upper canine teeth fits the space between the lower canine and first bicuspid tooth because of the larger width of the upper incisors in comparison to that of the lower ones.

Healthy teeth have smooth shining surfaces with varying color tones from a light blue to a more or less ivory color.

Various anomalies are found in the development of the teeth. *Congenital diseases* sometimes cause crescent shaped groove like defects of the incisor teeth. Irregular dental shapes as for instance the so-called *crenated teeth* with parallel transverse striation in the enamel are often found in *rickets*. In advanced age one often observes a recession of the gums from the crown so that the neck of the tooth is exposed. The health of the teeth decreases and they become carious with increasing civilization due in all probability to careful preparation of food and the restriction of the use of the teeth. Primitive peoples who have naturally healthy teeth often mutilate them the Malaysians for example sharpen them by filing. Polynesians sometimes extract their teeth as a sign of mourning. Other peoples attempt to beautify their teeth by artificial coloring.

The teeth are fitted in the alveolar processes of the upper and lower jaws. The upper jaw is inflexibly and immovably connected with the facial portion of the skull. There is a reciprocal interaction between the development of the maxilla and the teeth. Prognathism as in Negroes causes a lowering and forward direction of the lower part of the upper jaw. While the prognathism of the Negro represents a racial peculiarity protrusion of the upper jaw in Europeans is an anomaly. The upper lip under such circumstances appears too short while in racially peculiar

prognathism the upper lip appears overdeveloped and thickly arched in its lateral and lower parts

The chin moves with the mandible in the temporomaxillary articulation which is situated in front of the external auditory canal

A rotating movement of the lower jaw in the temporomaxillary articulation effects the opening and closure of the mouth. The lower jaw may be protruded in front of the temporomaxillary articulation causing the projection of the lower row of teeth above the upper and it can also be moved in a lateral direction to the articulation

The external muscles responsible for mastication and bringing together of the maxillae are the *masseter* (sloping from the zygomatic arch to the lower jaw) and the *musculus temporalis* (originating in the temporal region below the zygomatic arch)

Strong maxillary development is concomitant with strong general development. These parts are more strongly developed in the male than in the female in whom the outlines of the lower jaw are generally not visible but sweep the neck forward in a softly swung almost imperceptible cheekline

Maxillary atrophy goes hand in hand with the loss of teeth. The height of the maxillary bone is in direct relation to dental development. Only with the cutting of the teeth (*milk teeth*) the alveolar processes of the maxilla develop the jaws increase in height commensurate with the length of the root of the tooth. The maxillary height increases further only after the fifth year. While the cutting of the first milk incisors causes the first longitudinal development of the jaws further increase in height is caused by the development of the crowns of the permanent incisors which leads to enlargement of the alveolar processes. The cutting of the molar teeth causes further changes in which the direction of the ascending ramus of the mandible approaches a vertical line and the angle of the lower jaw becomes rectangular. This development proceeds in relation to the teeth. In infancy as well as in senility the angle of the lower jaw becomes more obtuse however and may reach about 145 degrees. The width of the jaws at the cranium of the child in comparison to the maxillary width of the cranium of the adult is very small. The dental compartments and alveolar processes tend to disappear with the loss of the teeth and the jaws become flat as in children.

It is clear that the changes in the maxilla and teeth during later years imprint the evidence of old age on the face. In complete physical and mental rest the muscles of the mouth are relaxed the mouth is somewhat opened and teeth slightly separated. In violent excitement the

jaws and teeth are strongly pressed together the lips are either tightly closed or drawn backward exposing the teeth

In smiling and laughing the teeth are more or less exposed In laughing the nasolabial furrow is deepened and the cheeks are displaced upward the labial margins become narrowed and the upper teeth bared

Mastication of food is effected as stated by the *maxillary temporal* and *masticatory muscles*

Violent states of irritability affect the facial muscles and produce strong masticatory movements of the teeth (grinding) The expression of rage is thus characterized by biting together of the teeth retraction of the lips and keeping the eyes wide open The biting of the teeth under these conditions is explained by Darwin on the ground that we cannot resist an atavistic inclination to inflict injury on an opponent with our teeth The expression of clenching the teeth is brought about by drawing the lips unilaterally in the direction of the enemy (Chap V) While the expression of rage is very frequently seen in the animal the dog for instance it is rarely observed in man and then only for a short period of time and most often in patients with mental disease Frequently the jaws are snapped together tightly causing the contours of the maxillæ and masticatory muscles to stand out prominently thus augmenting the threatening expression In suppressed wrath the lips are tightly pressed together

Biting of the lips is especially characteristic of an endeavor to subdue physical pain The teeth are tightly pressed together in severe physical pain In severe pain besides distortion of the face the mouth and the eyes as well are either closed or widely opened The mouth is often distorted on one side

In fear the maxillæ are relaxed as well as the entire musculature around the mouth which is opened Sometimes a general trembling of the masticatory muscles leads to the well known chattering of teeth

Hippocrates was the first to study the teeth and to formulate the aphorism The more teeth the longer the life Aristotle later reversed the dictum viz The less teeth the shorter the life

Teeth are composed of calcified hard substances (*dentine enamel* and the *peridentine*) The thickest layer is formed by the dentine It surrounds the dental cavity and is covered externally by enamel in its free part by the *corona dentis* The *peridentine* covers the root beginning from the neck of the tooth The *pulp cavity*, running approximately parallel with the shape of the tooth (*cavum dentis*) is continued as the *canalis radialis dentis* in the root or roots It ends with the *foramen apicis* The *tooth pulp* consists of soft parts filling the pulp-cavity and

also contains the nerves and vessels entering through the root canal. The soft tissues surrounding the tooth connect it with the bony structure of the alveolus, into which it is fitted with the root. The teeth are surrounded by the mucous membrane of the maxillae at the neck of the teeth and the gingivae in the vicinity of the alveolar processes.



Fig. 1a—Hutchinson teeth.

Man, just as most mammals, undergoes a unique change of teeth. The shape and anomalies of teeth are influenced by heredity, as are maxillary formations. Third dentition is sometimes reported; here the question of a delayed cutting of a previously retained tooth comes into consideration.

Root formation of the teeth sets in only when the development of the crown of the tooth is completed. The growth of the roots has already progressed (except for the last permanent molar tooth) when the

cutting toward the surface begins. Only with the completion of the cutting of the teeth (i.e., the complete exposure of the crown) the root growth also becomes complete. Complete absence of the permanent teeth has been reported.

Malformations of the teeth are exemplified in a striking manner. They go back to diseases during the tooth development which rest on



Fig. 1b—Hutchinson teeth

the result of inheritance or transmission in the form of syphilis (*Hutchinson's teeth*) (Figs. 1a and 1b). Rickets is another example. Other diseases besides these may also influence the dental development (various febrile diseases of childhood). Metabolic processes predispose to *caries*. McCollum and Simmons stress the value of vitamins in the development and health of the teeth and point to the beautiful teeth of primitive peoples among others Indians and Eskimos. After civilization reached Greenland *caries* appeared.

The enamel covering of the dental crown reaches its maximum thickness (up to several millimeters) at the places of strongest wear i.e., the

edges and eminences of the tooth. The transparency of the enamel depends upon the thickness of the structures and the existing light reflexes. Homogeneity of structure is increased with higher calcification and augmented transparency. The transparency of the dentine also increases with narrowing or filling of the dentine canal causing greater reflexion of light. Strongly calcified enamel shines through the yellow covering of the dentine; thus well-calcified strongly developed teeth often appear yellowish white. The deciduous teeth and the less resistant permanent teeth are of a more bluish white color apparently caused by a dull medium of less transparency. In anomalous tooth formation spots may appear in places of ill-developed enamel (insufficient calcification).

Dentine, the principal hard substance of the tooth, is like the enamel thickest in the vicinity of the enamel and incisors. However its thickness changes in contrast to the enamel whose thickness does not change after the cutting of the tooth (that is to say, it does not increase). The dentine lasts a lifetime and continues to grow thicker. Thus dentine does not form only where wear is manifest or where dental structure is destroyed through caries, but increases as a physiologic process with increasing age, causing diminution of the pulp cavity. The color of dentine is slightly yellowish (characteristic ivory tone). Discoloration of the dentine occurs especially in blood extravasations in the region of the pulp when blood pigments find their way into the dentine canals.

The *gingiva* covering the edge of the alveolar processes is of a more or less pale red color. The tissues of the gingiva are immobile and are very dense (Figs 2a and 2b).

A slight inflammatory condition confined to the border of the gums at the necks of the teeth is known as *marginal gingivitis*. The gums appear red and inflamed and may also become more or less everted. In *interstitial gingivitis* not only the gum borders are involved but the interstitial tissues as well are implicated in the pathologic process involving all the alveolar structures (pericementum, connective tissue, gums and bone). The etiology encompasses predisposing, exciting, local, general and constitutional criteria. Evidences of the pathologic process are chiefly confined to the roots of the teeth and the structures immediately surrounding them, but may extensively involve the adjacent bone and soft tissues.

Simple stomatitis (*stomatitis simplex*) is a slight more or less transient condition affecting the buccal mucous membrane. These clinical manifestations are usually coincident with similar affections of the skin surfaces. They may be outward expressions of digestive disturbances.



Fig 2a—Hypertrophic gingivitis of pregnancy (Courtesy of Dr S G Balkin)



Fig 2b—Exfoliative gingivitis (Courtesy of Dr S G Balkin.)

contagious infections and specific diseases it is the simplest of all forms which chiefly affect infants and is also due to gastrointestinal derangements. The symptoms are bright red elevated patches on the mucous membrane of the mouth appearing suddenly and usually disappearing in the course of a few hours or a few days.

In *catarrhal stomatitis* (*stomatitis catarrhalis*) the mucous membrane of the mouth is red and frequently covered with considerable exudate. It occurs more commonly in children than adults. Small vesicular lesions may form and sometimes erosions with grayish surface appear.

Aphthous stomatitis is the result of bad hygiene of gastro intestinal disturbances or other diseases (Fig 3). It occurs in both children and adults but more frequently in the former. Usually small bright red oval spots are first noticed quickly assuming a grayish white appearance because of the degeneration of epithelium. The lesions are superficial and do not tend to penetrate deeply or to affect the underlying deeper structures.

The most difficult form of stomatitis to differentiate from other types of this affection is *ulcerative stomatitis*, because the inflamed areas between and around the necks of the teeth affecting the gums and other surfaces of the buccal cavity may be associated with symptoms of many varieties of inflammation of these structures. It also may be the result of interstitial gingivitis (*pyorrhea alveolaris*) or of a general infection mineral poisoning a general systemic disorder local irritation etc. This disease may affect both children and adults the former chiefly when they are victims of poor hygienic conditions insufficient nourishment and depletion of the system by long continued fevers. In older persons it may eventuate from general uncleanness dissipation or excessive smoking or drinking. Conditions frequently found in this connection are *Vincent's angina* or *Vincent's stomatitis*, termed *trench mouth* and *oropharyngeal fusospirochetosis*, because the etiologic factors are believed to be the *Plaut-Vincent* micro organisms the fusiform bacillus and spirillum.

Gangrenous stomatitis (Fig 4) *cancrem oris*, or *noma* (Fig 5) is undoubtedly of infectious origin and usually attacks the gums or the cheeks the slough extending until it involves a considerable portion of the face. Streptococci staphylococci leptotriches and other micro-organisms have been identified in these cases thus the conclusion that the affection is polymicrobial. The consensus seems to be that there exists some underlying systemic condition which predisposes to gangrene rather than that the condition is due to factors of mouth infection.

Parasitic mycotic stomatitis or thrush (sprue) occurs most frequently in nursing children although it is occasionally found in adults after or during acute or chronic diseases. The lesions usually begin upon the tongue or cheek and spread to the tonsils, palate, pharynx, esophagus or lips. They are white or creamy white in color and may resemble curdled milk or may become brownish from the infiltration of extravasated blood. It may be diagnosed by the presence of the fungus and marked dryness of the mouth instead of the reverse condition which is usually found in stomatitis.

Foot and mouth disease affects lower animals principally cattle but it is also believed to be infectious to man. The symptoms are simple erosions without vesicles or the ulcers may spread over considerable areas of the surface of the mouth.

Pseudo membranous stomatitis is most commonly caused by the Klebs-Loeffler bacillus and is characterized by marked hyperemia which is followed by an exudate in the submucosa, exudates and transudates finding their way to the surface. Ulcers may form as dead tissue is thrown off.

Phlegmonous stomatitis affects the lips more frequently than other portions of the mouth. It may be secondary to facial erysipelas or other inflammation of the cellular structures of the face or marked trauma with intense infection. The symptoms are swelling of the lips and cheeks with a tendency to suppuration and abscess formation which may rupture within the mouth.

Ludwig's angina (diffuse suppuration of the floor of the mouth) is a diffuse submaxillary cellulitis or acute infectious submaxillary angina affecting the tissues of the floor of the mouth. The source of infection is usually from ulcers, necrotic conditions of the mucous membrane of the mouth, injuries to the floor of the mouth or extension of disease from the pharynx, etc. The microorganisms are usually streptococci, staphylococci, pneumococci and other pyogenic bacteria. The symptoms are ulcer formations under and around the tongue with occasional abscess formation. Induration of the tissues sometimes forces the tongue upward and backward until the swelling occupies the entire submaxillary space. It may extend downward into the neck or involve the pharynx, tonsils and larynx.

Anomalies and deformities of the maxillae and the teeth may be hereditary and predicated on embryologic influences. The latter may cause deformities, constrictions, fissures, malformations due to arrest of development, dislocations and other defects such as exuberant growth, etc. *Macrognathia* is rare, *congenital micrognathia* of the lower jaw (*microgenia*, a reduction of the size of the entire jaw) is also observed.

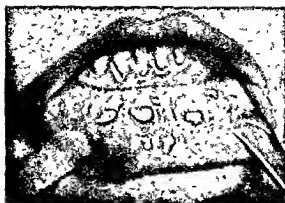


Fig. 3—Aphthous stomatitis.



Fig. 4—Gangrenous stomatitis.



Fig. 5—Noma.



Fig 6—Girl 17 years of age congenital underdevelopment of lower jaw
(Gould Medical Curiosities)



Fig 7—Man 23 years of age congenital underdevelopment of lower jaw with ankylosis
of mandibular joint (Gould Medical Curiosities)

(Figs 6 and 7) Malformations due to arrest of development of the jaw (gnathoplatoschisis) originate from arrest of formation of the palatine process of the upper maxillary bone. Lack of space or restriction of space by adjacent teeth leads to malformations due to the arrest of development of the teeth (dwarfed teeth). Dislocations may lead to serious consequences if for instance the crown of a cutting tooth breaks into the antrum into the nasal cavity or the cheek.

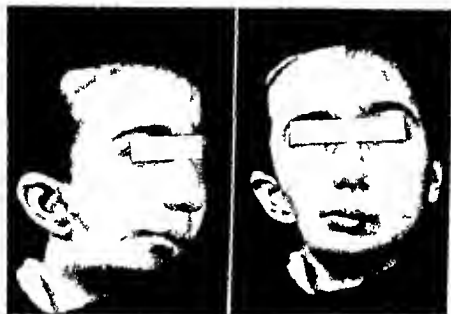


Fig 8—Congenital absence of the ramus of the mandible
(Courtesy of Dr V. H. Kazanjian)

Semihypertrophy of the face with marked enlargement of the teeth is of special interest and is rare. One side of the face begins to enlarge in early youth: the bones and the soft parts as well as the teeth enlarge greatly. Clerc of Bordeaux reports such a case. Some of these cases are congenital. A patient reported on by Port showed a difference in the development of the two sides of the face from childhood: the left side the larger, finally became so augmented around the eighteenth year that the tension of the skin obliged the patient to submit to the removal of a piece of the maxilla: improvement was only temporary.

Maxillary and facial fissures occur in a large variety of forms. They originate through arrest of development through exogenous influences etc.

Specific malformations of the maxilla occur only rarely and are discovered at birth (Fig 8).

The development of the upper jaw is frequently disturbed by malformations of the intermaxillary process or by fissure formations. Hypoplasia as well as hyperplasia may also occur in malformations of the lower jaw. Both maxillae may be affected simultaneously. Changes in size and form may affect the alveolar process. Dental anomalies (too large teeth



Fig 9—Leukoplakia buccalis (Courtesy of Dr. Lester Hollander)

dwarf teeth, irregular dental position) exert a variety of influences on the alveolar processes depending upon their size and position.

Neoplastic diseases of the dental area may be either benign or malignant (epithelial tumors, connective tissue tumors, mixed-cell tumors, and embryoid tumors). The theories for the origin of tumors concern heredity, irritation, embryonal and parasitic causes, dietetic factors, etc. Tumors develop more often after middle life; tumors developing in middle life

usually belong to the connective tissue class. Tumors of the mouth affect men more frequently than women. Among the predisposing factors are irritation, leukoplakia, chronic ulcers, etc. (Figs 9 and 10).



Fig. 10—Leukoplakia of corner of mouth. This view shows extension on the alveolar ridge. (Courtesy of Dr. S. G. Balkin.)



Fig. 11—Papilloma of gingivae (epulis). (Courtesy of Dr. S. G. Balkin.)

Papillomas are usually slow growing benign tumors and present the appearance in the mouth of hard or soft papillomas; the former are smooth or cauliflowerlike excrescences of varying size while the latter are of grey or red color. Adenomas are usually benign tumors arising



Fig 12—Epulis (Courtesy of Dr S G Balkin)



Fig 13—Epulis Benign giant-cell tumor



Fig. 14—Carcinoma of upper alveolar ridge (Courtesy of Dr. Lester Hollander)



Fig 15—Carcinoma of lower alveolar ridge (Couttesy of Dr Lester Hollander)



Fig. 16—Syphilitic perforation of palate. (Courtesy of Dr. S. G. Balkin.)



Fig. 17—Syphilitic perforation of palate.



Fig 18—Fibroma growing from the junction of alveolar ridge and floor of mouth
(Courtesy of Dr Lester Hollander)

from the glandular epithelium. They are frequently found in the lower jaw in the third molar or bicuspid region and seldom in the anterior part of the mouth. Persons of all ages may be affected (Figs 11, 12 and 13).

Carcinoma of the mouth may be caused by irritation or infection or both. Syphilis may be among the predisposing factors. Men also are more susceptible than women. The theory that tobacco is a predisposing factor (Roffo) seems to be well founded. Heredity, misplaced embryonic



Fig. 19—Denture injury tumor due to wearing of ill fitting dentures for a long time (Courtesy of Dr S G Balkin)

cells, poor elimination, predisposition due to occupation may be other etiologic factors. Sites of predilection are the lips, especially the lower lip, tongue, cheeks, floor of the mouth, palate, buccae, and the alveolus surrounding the teeth. Cancer occurs mostly in middle and later life (Figs 14, 15, 16 and 17).

Fibromas are benign connective tissue growths and seem to result from irritations from dental appliances such as plates, bridges, and irritating fillings. Fibromas may be soft or hard and of varying size, affecting the cheeks, gums, tongue, and soft palate. The growth is usually slow (Figs 18 and 19).

Lipomas are benign tumors of fatty tissue which may affect any part of the mouth. They may reach large proportions. They may ulcerate or degenerate. Although usually seen in adults, these tumors sometimes

are observed in children and seem to have developed on a congenital basis. *Chondromas* are usually benign growths which may be multiple. They occur usually at an early age and are sometimes congenital. On occasion they may become malignant. *Osteomas* are benign slow growing tumors and may be caused by impacted unerupted or infected teeth or they may be the result of misplacement of tissue or embryonic tissue.



Fig. 20—Pyogenic granuloma (epulis) (Courtesy of Dr. S. G. Balkin)

in the Cohnheim sense. They may grow to a large size and appear at all ages.

Odontomas consist entirely of dental tissue (enamel, cement and dentine). Various irritations, mechanical and nutritional disturbances play an etiologic part here. No age is exempt. The permanent teeth only are affected. These tumors are benign and usually appear earlier in life than osteomas. *Myomas* are found only rarely in the mouth. *Angiomas*, composed mainly of blood and lymph vessels, appear in and around the mouth.

Giant cell tumors (*epulis sarcomatous epulis giant cell sarcoma*) may result from irritation or from misplacement of embryonic (Cohn heim) cells. These tumors may be benign or malignant and appear usually in the interproximal space between the teeth most frequently in the region of the bicuspid or central teeth. They are dark red and



Fig. 21—Pyogenic granuloma (Courtesy of Dr. S. G. Balkin)

project above the surface of the gum and bulging of the inner and outer alveoli (Figs. 20 and 21).

Sarcomas are malignant neoplasms frequently affecting persons in early adult life. These tumors are of rapid growth. After removal they tend toward recurrence, hemorrhage, ulceration, and degeneration. Often the gums and mucous membranes are affected. The most malignant of the sarcomas are the melanotic type. These seldom occur in the mouth but they have been reported to appear in the upper jaw (Figs. 22 and 23).

A variety of cysts of bone and of dental tissues are observed: radicular cysts (root cysts, dental pericoronal cysts), cysts of the maxillary sinus, follicular (dentigerous) cysts, and cystic adenomatomas (multilocular cysts) (Figs. 24, 25, and 26).



Fig 22—Sarcoma of upper jaw (Courtesy of Dr Lester Hollander)



Fig. 23—Sarcoma of the jaw



Fig. 24—Large dental cyst. (Courtesy of Dr. K. W. Penhale.)

Malformations of the teeth appear in the form of double malformations odontopagy defective and excessive formations of single teeth as well as deformities

Defects in the structure of the teeth are observed in a great variety of forms in children as well as in adults Hypoplasia of the tooth enamel



Fig. 25—Dentigerous cyst of maxilla. Parisch operation. (Courtesy of Dr. S. S. Balkin.)

may occur at the time of ossification and it is possible according to each tooth affected to recognize the time of the development of this hypoplasia. Malformations in the milk teeth antedate birth. Not only the enamel but the other hard dental substances and the pulp-tissues as well may be affected by hypoplasia.

Rickets is an etiologic factor in retarded tooth cutting as well as in dental disfigurements of rachitic children. Damage of the milk teeth as well as the permanent teeth may be manifest in rickets. Hypoplasia on the other hand may occur in children without rickets. Children affected

with rickets may have healthy teeth thus no direct connection can generally be assured between rickets and dental hypoplasia. Hereditary syphilis should be thought of although no definite proof can be derived from the finding of Hutchinson's teeth alone. Hutchinson called attention to the semilunar shaped defects at the edge of the upper incisors as well as the peculiarly shortened crown. Defective development in the size



Fig 26—Multi-ocular cyst (From Westmoreland)

of the teeth *microdontia* is sometimes associated with endocrine disturbances (myxedema). Among 100 idiots with disturbance of internal secretion Sollier found that about 14 per cent had *microdontia*. Dwarfed dental formations, persistence of milk teeth, diastema, etc. occur relatively frequently in *infantilism*.

Tuberculosis of the oral mucous membrane may be primary but appears more frequently secondary to pulmonary tuberculosis. The lesions may appear first as small nodules of yellowish color. They usually undergo ulceration before reaching a larger size. *Lupus* of the face usually is associated with *lupus* of the mouth.

Scurvy (scorbutus) affects the blood and general system. It is due to absence from the diet of foods which contain vitamin C (Fig 27). The symptoms are spongy bleeding gums due to gingivitis, hemorrhagic petechiae on the skin and a tendency to hemorrhages of the nasal, buccal and pharyngeal mucous membrane, mental depression, marked and pro-



Fig. 27—Scurvy

gressive emaciation. It is rare in very early youth. In the early stages of the disease the soft, spongy, bleeding gums are characteristic. Pain in the gums may be a prominent symptom.

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CHAPTER XIII

THE TONGUE AND THE FACE

THE TONGUE is a median of diagnostic value in different important pathologic conditions of the body. Involvement of the tongue, besides mirroring the existence of abnormal conditions, may on occasion cause marked disfigurement to the face.

The tongue is the organ of taste and speech. Its foramen cecum (a small pit about 1 cm. deep) is situated posteriorly on the dorsum of the tongue and at the terminus of its median raphe. The covering of the tongue shows a characteristic relationship to the skin, as well as to the mucous membrane. Accordingly, it might become affected by diseases peculiar to the skin, such as the neoplasms, *epithelioma* and *papilloma*. The normal stratified epithelium covering the tongue is moist, as is the mucous membrane; it is highly vascular, and it is connected with a rich network of lymph vessels and lymph nodes. Slight variations on its papillary surface hypertrophic as well as atrophic, may be observed under normal conditions. An aggregation of lymph tissue at the base of the tongue, the *lingual tonsil*, is situated at the junction of the mouth and nose with the pharynx and is especially well-developed in man. The base of the tongue may best be seen by means of a laryngoscopic mirror without forcibly drawing the tongue out. By depressing the front of the tongue it can be seen only imperfectly.

Extending from the *circumvallate papillae* backwards to the *glossopiglotic fold*, and continuing on each side to the tonsil, the surface of the base of the tongue is partly covered with vascular prominences, and partly has a smooth surface. These prominences are spherical and are from 1 to 5 mm. in diameter. Depressions of 1 mm. represent the openings of the ducts of mucous glands as well as of the follicles. Sometimes there are only a few follicles, at other times they are connected to larger masses with slit-like orifices. Their number may vary greatly (between 34 and 102). The *lingual tonsil*, just as the faucial tonsils, differs widely in various individuals. It may be the seat of hypertrophy, abscess, follicular inflammation, or tumors.

The blood supply of the tongue is rich in arteries and veins. The *lingual artery*, originating from the second branch of the external carotid, is distributed along the hyoid and adjacent muscles, the sublingual gland, mouth, and tongue. The position of the artery within the mouth depends upon the position of the tongue. When the tongue is at rest within the mouth, the lingual artery, viewed from the side, displays an arched course

from the apex of the great cornu of the hyoid bone to the tip of the tongue. The arch is higher the more the tongue is retracted. When the tongue is forced out of the mouth the hyoid bone is pulled upward. The course of the artery then presents a straight line from the apex of the great cornu to the tip of the tongue. When the tip of the tongue is curled upward or is held up the *ranine veins and venules* appear spread on either side of the middle line. The nearer the arteries are to the tip of the tongue the more they approach each other. The lingual artery is in regard to its origin as well as its course one of the most constant arteries. Above it or even in common with the lingual the facial or external maxillary artery arises from the external carotid.

Between the facial layers or beneath the deep fascia course the *lingual veins* passing from the tongue and floor of the mouth across the submaxillary region. The facial and lingual veins join the internal jugular about the level of the hyoid bone. The superior thyroid vein joins the lingual or facial or both before it enters the internal jugular. The *submental veins* course toward the anterior jugular and also communicate with the facial or internal jugular veins. The sternomastoid vein to the external jugular is crossed by veins from the base of the tongue and submaxillary glands and also communicates with the anterior facial vein. The *lymphatics and lymphatic nodes* play an especially important part in diseases of the tongue. The main lymph channels from the tongue have their junction in the chain of lymph nodes which lie on the internal jugular vein at about the level of the bifurcation of the carotid artery and the hyoid bone.

The *muscles of the tongue* are innervated from the opposite motor region of the brain at the lower end of the fissure of Rolando through the *corona radiata*, internal capsule and *crusta*. The nerve fibers then cross to the opposite *hypoglossal nucleus* and course to the *facial nucleus*. The tongue therefore may become paralyzed on the side opposite that of a *facial paralysis*.

The *afferent nerves* of the tongue are complex. The nerve of common sensation and of taste supplies anterior two-thirds of the tongue (function motion and sensation) the nerve of facial origin is the *lingual nerve*. The *chorda tympani* nerve of facial origin may arise by the *pars intermedia* of *Wrisberg* from the upper end of the *glossopharyngeal nucleus*. Its function is sensation taste and motion it supplies the posterior third of the tongue with common sensations and taste. The function of the *superior laryngeal nerve* is that of sensation and motion it is of *pneumogastric* origin and supplies fibers to the epiglottis and to the base of the tongue.

The *sublingual portion of the tongue* harbors mucous and salivary glands, lying upon the muscles which connect the hyoid bone and the lower jaw. The *submaxillary gland* is a salivary gland situated below the angle of the jaw and lies partly on the outer side of the *mylohyoid muscle* and partly behind and on the inner side of it. The *sublingual gland* is a salivary gland situated on each side beneath the tongue. It is composed of lobules of *alveoli* which are more loosely connected than those of the *submaxillary gland*. The *gland of Blandin*, a mucopurulent gland, is situated near the tip of the tongue in the median line and opens by several ducts upon the lower surface of the tongue. It has the size and shape of an almond. The tongue is one of the most sensitive parts of the human body. When at rest its length measures about $3\frac{1}{2}$ inches. It becomes thinner and longer when it is protruded.

Congenital defects of the tongue are rare. Due to its arrest during the development of the tongue malformations may result. The one most often observed is the so-called *tongue tie* *ankyloglossia*, which consists of a congenital shortening of the frenum of the tongue. Very rare malformations are *absence of the tongue* or fusion of the tongue with the floor of the mouth and *bifid* or *split tongue*.

In cases of congenital *ankyloglossia* (*adherent tongue*) the tip of the tongue is adherent to the floor of the mouth due to an extraordinary shortness of the frenum and the folds of mucous membrane on both sides of the frenum. As in other congenital malformations the *tuberculum impar*, a rounded elevation between the ventral ends of the mandibular and hyoid arches from which the papillary portion of the tongue is developed, is the site of defect. The projecting portion of the tongue becomes imperfectly developed from the *tuberculum impar*. Persistence of such an anomaly is extremely rare.

So-called *absence of the tongue* is so rare that the following case, which apparently is the first one recorded, is usually quoted as an example. *Jussieu in 1718 reported the case of a girl who at the age of 15 had a small elevation instead of a tongue in the middle of the floor of her mouth three or four lines high. The structure was muscular and could be moved. There was very little interference with speech but mastication and swallowing of solid food was difficult. Several cases of partial absence of the tongue (always due to lack of development from the tuberculum impar) are reported.*

Bifid or *split tongue*, an analogous condition to the natural bifid tongue of certain snakes and reptiles, is sometimes seen in the newborn. The fore part of the tongue is divided by a longitudinal fissure, sometimes extending back toward the root for some distance. It does not

interfere seriously with the function of the tongue. Because of the deforming appearance an operation is sometimes desired; however, this is rarely indicated. The cleft appears healthy and is completely covered with mucous membrane. Sometimes bifid tongue is associated with other malformations such as a cleft lower lip, a maldeveloped lower jaw and cleft palate. Ahlfeld observed deep clefts of the face occurring with bifid tongue. The so-called *double tongue* is caused by a ranula

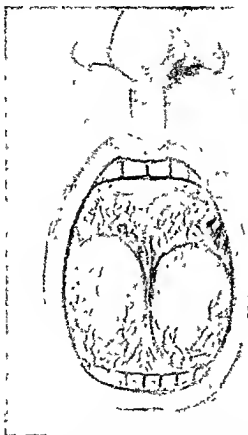


Fig 1—Sublingual ranula (Redrawn from Forgue.)

under the tongue, or by enlarged sublingual salivary glands (Fig. 1). Some authors have described it as a certain degree of bifid tongue. There are cases reported with three and even more lobes of the tongue. They all seem to have been associated with other serious maldevelopments.

The other extreme of too short a frenum is present in cases in which the frenum is too long and the tongue is of excessive mobility which causes "tongue swallowing." These cases are much more serious than those with too short a frenum and in several cases the child died. Such cases were reported by Petit in 1742, in a memoir to the *Académie Royale*

des Sciences. Extreme length of the tongue a congenital peculiarity is regarded by some authors to be of taxonomic significance. Lournier reports the case of a woman whose protruded tongue reached such a length that it hung over the teeth in folds and another case that of a girl who could touch her chest with the tip of her tongue when it protruded. Iow describes a boy of eight years whose tongue was five inches long. Despite this lingual length however his teeth had room enough and his jaws



Fig. 2—Cyst of the floor of the mouth. Duration over 30 years (Courtesy of Dr. J. E. Schaefer)

were well developed. Sometimes defects of speech result from too large a tongue.

Although the appearance of the tongue is of special significance clinically and diagnostically in different pathologic conditions especially of the alimentary tract it varies also under normal conditions in different individuals. The special cornified epithelium sheds gradually depending upon the activity of the surface this changes its appearance. Diet has an effect on the appearance of the surface of the tongue for solid food exerting greater friction on the tongue leaves the epithelium thinner and more worn than a liquid diet which subjects the surface to less friction and leaves the epithelium thick and loaded with bacteria. Usually the color of the tongue in man as well as in animals is pink interspersed with red spots of more or less deep hue. Not all animals however show

this color of the tongue it is sometimes brown black etc. An unusual pigmentation of the human tongue may be therefore of atavistic importance.

Pathologic pigmentation of the human tongue, as well as of the mucous membrane lining of the mouth is present often in patients with Addison's disease. The mucous membranes of the tongue lips and cheeks like other parts of the skin of the body have a dark appearance. Greenhow reported a case with patches of a bluish black color on each side of the tongue as well as on its tip while brown patches appeared inside of the cheeks and lips. No other discoloration of the skin of the body was present. It was a case of advanced pulmonary tuberculosis with pigment deposits only in the corpuscles of the connective tissue of the papillae and of the submucous layer. Danlos reports a case of a man with pigment discoloration of the left side of his tongue and changes in color of the mucous membrane of the mouth who suffered from chronic kidney and heart disease bronchitis and emphysema.

It is an interesting fact that the size of the tongue varies with the blood pressure. In cases of excessive thirst the tongue shrinks while the pulse fails. A pale tongue is seen in anemia. In acute fevers and high pulse rate the color of the tongue is bright red. In cyanosis its color is bluish.

The fur like coating of the tongue present also to a more or less degree under normal conditions contains large amounts of microorganisms *micrococci bacilli spirochetes vibrios* and yeasts. The fur like coating is limited to the areas of the tongue covered by the filiform papillae. The tongues of young infants with very small filiform papillae, are therefore almost without coating. In normal adults the coating forms during the night especially while during the day different mechanical factors tend to remove it e. g. mastication movements of the tongue friction between the roof of the mouth and teeth on one side and the surface of the tongue on the other cleansing brushing etc. The amount of fur on the tongue varies widely in healthy individuals.

Certain foods may of course stain the tongue into different hues for instance the black coloring from blackberries the red color of cherries raspberries and other fruits and the yellow from saffron and rhubarb and the brown from tobacco licorice and chocolate etc. Applications from other staining material such as ink chromic acid or other acids colored pencils etc. may all impart to the surface of the tongue a variety of colors.

Sometimes under certain pathologic conditions the tongue becomes dry brown or shrunken (septic peritonitis). This latter condition is

due to failing pulse tension. There is a lack of salivary secretion and inability to close the mouth because of lack of muscular power of the muscles controlling the closing of the jaws. This further contributes to the dryness of the tongue. Cholera, acute diarrhea and excessive thirst cause dryness of the tongue. Thickening of the tongue is reported in cases of typhus fever, advanced cases of intestinal obstruction, septic peritonitis, kidney disorders, heart insufficiency, phthisis, delirium, mania and other disorders. Improvement in the appearance of the tongue with an increase of moisture are of high diagnostic value regarding improvement of the patient's condition. A dry parched tongue is an important diagnostic criterion.

In some cases the tongue is not only without coating but appears to be bare and red with a special thin epidermis. Some persons have an especially thin horny layer and the usual pink color of the tongue resembles more or less the raw appearance of beefsteak. This appearance is usually associated with a slight increase in the sensitiveness of the tongue. In some cases of chronic dyspepsia, especially in females, an exposed bare red tongue is seen. In old persons or in certain conditions of exhaustion when the filiform papillae have more or less disappeared the tongue tends to become dry, tender and slightly excoriated. As a result of diminished secretion of saliva and mucus the tongue as well as the mouth may become persistently dry. This usually affects women past middle age and is apparently a condition of nervous origin. This dryness of the mouth, *xerostomia*, is rare; it is observed some times after influenza, mental shock, worry and parotitis.

Trauma caused by accidents to the tongue may contribute to many deformities. By partaking of too hot foods, children as well as adults frequently burn their tongues, causing painful tender, red spots or excoriations of the surface of the tongue. Burns from chemical agents usually cause more severe burns of the tongue (acids, caustic alkalis, corrosive sublimes, etc.). Injuries to the tongue may also result from insect bites or bites of reptiles. Due to the vascularity of the tongue and its large supply of lymphatics such bites may prove fatal. In severe cases gangrene and suppuration may follow; in less severe instances the acute swelling may be accompanied by acute edema.

Rather frequently the teeth cause wounds of the tongue. Cases of death have been reported following such wounds. Legg reports cases of hemophilia with fatal consequences following bites of the tongue as a result of continuous hemorrhage. *Epileptic patients* are known to inflict bites on their tongues during seizures. Also in cases of puerperal eclampsia the tongue may become severely bitten. Wounds from bullets



Fig. 3—Interstitial glossitis (Courtesy of Dr. Lester Hollander)



Fig. 4—Interstitial syphilitic glossitis (Courtesy of Dr. Lester Hollander)



Fig 5—Scrotal tongue (Courtesy of Dr. Lester Hollander)



Fig. 6—Leukoplakia of tongue (Courtesy of Dr. Lester Hollander)

or other weapons may cause many serious injuries particularly during war times

Acute inflammation of the tongue (glossitis) is rare on account of its soft consistency and its lack of strong fascial boundaries swelling of the tongue may develop very rapidly and assume large proportions (Figs 3 4 and 5) It may result from different traumatism stings from insects scalds burns or bad teeth The tongue may become so enlarged as to protrude from the mouth Salivation is increased Repeated irritations drinking of strong alcoholic beverages chronic intestinal or gastric catarrh or excessive smoking may cause chronic inflammation such forms of *chronic glossitis* as *black tongue leukoplakia buccalis* and *ichthyosis* The so-called *smoker's tongue* or *leukoplakia* shows irregular white patches raised on the dorsum of the tongue It occurs not only in smokers but in persons who have never smoked it affects men mostly Persons with and without syphilis are among the victims Unless epithelioma develops on the site of the patches it is harmless in most cases (Fig 6)

Black tongue (black hairy tongue melanoglossia keralomycosis linguae lingua nigra hyperkeratosis linguae) is characterized by black or brown patches on the dorsal surface of the tongue *Geographic tongue (lingua geographica eczema erythema migrans wandering rash)* shows a desquamation of the epithelium on the dorsal surface of the tongue together with circular patches in which the filiform papillae disappear while the fungiform papillae remain The patches spread in ringworm like fashion over the dorsal surface of the tongue If there are more patches than one present they coalesce giving a scalloped margin which accounts for the term *geographic tongue* (See Chapter XIX Fig 47) Due to their smoothness the areas appear redder than under normal conditions The cause of this condition is not clear Children as well as adults may be affected but mostly persons with gout or with poor digestion are thus afflicted

The form of glossitis known as *Moeller's glossitis* is seen principally in women It is a rare condition and is characterized by chronic superficial excoriations of the tongue (*glossodynia exfoliata*) Its etiology also is not known A burning sensation accompanies the appearance of whitish spots or nodules on the tip of the tongue lateral margins and dorsum There is much pain

There are many forms of *stomatitis* characterized by inflammations and infections of the buccal mucous membrane *aphthous stomatitis (canker sore dyspeptic ulcer, mycotic stomatitis)* (See Chapter XII Fig 8) This disorder is characterized by the appearance inside of the lips After opening of these vesicles yellow white ulcers form In

fection by microorganisms from the mouth is supposed to be the cause. People with low resistance and bad digestion are principally affected. Another infectious form of stomatitis is presented by *parasitic stomatitis* (*thrush mycosis, white mouth*) and is seen on the mucous membrane of the tongue and the mouth. Slightly raised soft white patches appear and spread quickly and coalesce. Later the color of the patches changes



Fig. 7.—Infection due to *saccharomyces albicans*.

to yellow or brown and scaling off leaves a bleeding surface. *Saccharomyces albicans* (Fig. 7) is responsible for the condition. Undernourished children especially and persons in poor health in general become affected. The tongue is also affected in cases of *sprue* a tropical disease occurring mostly in the East Indies. The corneous layers of the tongue separate and leave the surface red and smooth. It does not appear to be contagious. *Angioneurotic edema* with sudden swelling usually affects the tongue as well as the lips and the face in the infraorbital area.

Noma (*gangrenous stomatitis, cancrum oris*) (See Chapter VII Figs. 4 and 5) is rare while the tongue is seldom involved it may nevertheless become affected by extension from the cheek where the unilateral

gangrene may start. The disease spreads with remarkable rapidity. No other disease resembles these frightful deforming bluish infiltrations which soon turn black and gangrenous, spreading and perforating the cheeks. The disease is apparently caused by an organism, perhaps a *hemolytic streptococcus*. Children, especially girls, are mostly affected.

Some minerals and medicaments may cause stomatitis involving the tongue. *Mercurial stomatitis* due to poisoning with mercury may be contracted either by medical treatment with mercury or in an occupational way such as working in quicksilver mines, laboratories, mirror factories, barometer and thermometer departments, etc. It is interesting to note that patients with syphilis appear to have a higher resistance to mercury, so that mercurial treatment meets with increased, although not unlimited, tolerance. In cases of mercurial stomatitis the tongue, among other symptoms, becomes swollen and the edges indented. Chodoss reports the case of an adult patient whose tongue became swollen to such an extent that the jaw was dislocated. In cases of *arsenical stomatitis* the tongue becomes dry and parchment-like. *Bismuth poisoning* may cause a form of stomatitis involving the edges of the tongue as well as other parts of the mouth, with a bluish black discoloration.

Aphthae epizooticae (the foot and mouth disease of animals) is rare and may be contracted by man through animal milk or contagion. Sagar reported in 1765 that monks of a monastery in Moravia, whose diet consisted mostly of milk, showed vesicles on their tongues, cheeks and lips, spreading later to their arms and hands. The *bacillus of Siegel* is the cause. Siegel and Bussemin reported 16 epidemics of this condition in Germany between the years of 1878 and 1896 in which humans became affected. Sometimes whole townships may become infected. However, there is little disposition in human beings toward foot and mouth disease.

Leprosy of the tongue is rare but may occur by extension from the skin of the face. Nodules may appear on the tongue and other parts of the mouth. These lesions are always caused by the *lepra bacillus*.

Glanders (farcy malleus) is rare in humans but may be contracted from horses that are infected with *Bacillus mallei*. Small nodules may involve the tongue, lips and other parts of the mouth. These lesions soon form deep ulcers. The prognosis is grave and death usually follows.

Another disease contracted by man from animals and sometimes involving the tongue is *anthrax* (*splenic fever, anthrax edema, malignant pustule, wool sorter's disease*). The *anthrax bacillus* is the etiologic factor. People working with cattle such as butchers and farmhands, and

those handling articles from animals such as hair wool and hides may become infected

Measles (*rubeola morbilli rubella*) shows a tongue coated with a fur of creamy color which is cast off later leaving the surface of the tongue smooth and reddened *Scarlet fever* presents a characteristic picture of the tongue The so called *raspberry or strawberry tongue of scarlet fever* is swollen the small papillae especially become enlarged The tip and margins are red and the middle area of the tongue is coated with a yellow white fur

In typhoid fever the *typhoid tongue* appears crusted brown and dry In other diseases the tongue may assume a similar appearance for instance in intestinal obstructions septic peritonitis mania delirium tremens cerebral disturbances advanced stage of cardiac failure certain forms of carcinoma and tuberculosis The tongue becomes small and shriveled as in cholera sprue dysentery and acute diarrhea in which the body loses much fluid *Paratyphoid* presents a similar picture of the tongue brown crusted dry Dawson states The tongue in this disease (*paratyphoid*) has often a worse appearance than the patient According to Whittington some cases of acute Hodgkin's disease present a similar appearance of the tongue

Leukoplakia is seen in connection with *lichen planus* of the skin Places of predilection are the mucous membrane of the tongue lips and cheeks The mucous membrane becomes covered with white spots streaks or plaques The etiology is obscure Leukoplakia is seen also in connection with *psoriasis* of the skin and in tuberculosis

Tuberculous affections of the tongue are rare (Fig 8) However Scott reported 231 cases from the literature and Durrant 250 cases Men are more liable to this infection Either direct infection of the tongue or indirect may occur through the lymphatics Usually patients with tuberculosis of the air passages become affected There are different forms of tuberculous infection of the tongue viz ulcers tuberculous fissures the verrucose or papillomatous forms nodules from infection of the muscular tissues and cold abscesses Another form of tuberculosis of the soft tissue of the mouth is present in *lupus* with the formation of groups of superficial tubercles Lupus of the mouth is usually connected with lupus of the face

One of the most important diseases of the tongue next to carcinoma and one of the most frequent is *sypilis of the tongue* (Fig 9) *Primary sypilis of the tongue* or *chancre* affects men more often than women Erosions papules or ulcers may appear on the tongue According to



Fig. 8—Tuberculosis of tongue (Courtesy of Dr. Lester Hollander)

Fournier, out of 642 extragenital chancres 382 were on the lips 53 on the tongue. The tongue may become primarily infected from use of infected spoons, forks, pipes, etc. used by others. Dirty, grayish ulcers with indurated bases form. In the secondary stage of syphilis seen at all



Fig. 9—Early syphilis of the tongue

ages sometimes on the tongues of babies or very young children who acquired the disease *in utero*, the sides and the tip of the tongue are usually affected although the dorsum or the under surface also may be involved. These *mucous patches* are usually multiple. Although other signs of syphilis may appear on other parts at least for a time, a single patch occurs on the border of the tongue without other syphilitic signs



Fig. 10—Carcinoma of base of tongue beginning as a papilloma. Treated with electrocoagulation followed by radium.



Fig 11—Mouth after coagulation.



Fig 12—Carcinoma of tongue

present. Patches may become ulcerated. *Tertiary plaques* may be superficial or deep. The former appear to be of a deeper red than the surrounding mucous membrane. They vary in size and shape and tend to form fissures or ulcers. These ulcers are exquisitely painful. In severe



Fig. 13—Carcinoma of tongue with metastasis (Courtesy of Dr. Lester Hollander)

cases leukoplakia may result from *tertiary syphilis of the tongue*. Usually leukoplakia and sclerosis occur together. Occasionally the entire tongue becomes extremely swollen enlarged and hard with resulting *syphilitic macroglossia*.

The only variety of *carcinoma* attacking the tongue is the *epithelioma* or *squamous cell form*. The anterior half of the tongue is more often involved than the under surface or the dorsum. Persons between 40 and 60 are usually affected. *Blisters excoriations ulcers fissures nodules* and other forms of lesions may appear (Figs 10 11 12 and 13).

Sarcoma of the tongue is rare. *Angiomas of the tongue* are equally infrequent. Sometimes a *lymphangioma* appears on the tongue in the form of groups of vesicles (Figs 14 and 15). Another rare tumor of the tongue is *chondroma*. *Fibromas of the tongue* may be soft or hard. Oc-



Fig 14—Lymphangioma of the tongue (Redrawn from a photograph in McFarland's Surgical Pathology.)

asionally *lipomas of the tongue* are seen either appearing on the tongue or under it. *Papillomas* may appear on the dorsum of the tongue and usually remain small (Figs 16, 17 and 18).

Macroglossia, enlargement of the tongue, is usually congenital and seldom acquired (See Chapter VI, Fig 18). The abnormal lingual enlargement often causes the tongue to protrude from the mouth. Syphilis and cretinism are the main causes. The protruding exposed

part of the tongue becomes cracked and desiccated. The results of the enlargement of the tongue in all its parts are separation of the teeth, partition of the lips, and covering of the chin by the protruding portion of the tongue. The tongue may show a dark, sometimes bluish discolora-



Fig. 15—Angioma of the tongue (Courtesy of Dr. F. E. Simpson)

tion on its exposed part, its mucous membrane may be thickened, and it may become covered with crusts. *Muscular macroglossia* (simple *macroglossia* or *muscular hypertrophy of the tongue*) presents a parenchymatous enlargement of the tissue of the tongue. Sometimes it is characteristic of some forms of mental deficiency, such as cretinism, mon-

golisn, and idiocy Quite often the lingual hypertrophy is accompanied by other malformations and hypertrophies, such as enlargement of the whole head or part of the head

Paralysis of the tongue (glossoplegia) may be unilateral or bilateral Usually it is caused by disorders of the central nervous system, such as tumors apoplexy, or syphilis Sometimes it follows an attack of diphtheria, typhoid fever, lead or mercury poisoning *Inability to protrude*



Fig 16—Papilloma of tongue (Courtesy of Dr S G Balkin)

the tongue may be caused by general and bulbar paresis, syphilitic meningitis cerebral tumors or tumors of the upper cervical cord, pseudo bulbar or diphtheritic paralysis ribes dorsalis, or tuberculous meningitis

The tongue may be affected by spasmodic involvement of the muscles supplied by the seventh nerve During these spasms the tongue may protrude from the mouth or be pressed into the cheek Small tremors and movements appear in cases of atrophy and in old age Tremulous conditions of the tongue are caused sometimes by chronic alcoholism, and occasionally by tobacco *Tremor of the tongue*, as well as of the lips is seen sometimes during the deliria of typhoid fever As mentioned before, epileptic seizures usually involve the tongue and bites may be

inflicted. In mild cases of *epilepsy* the tongue may be the only organ involved. In *pernicious anemia* a smooth tongue and pain in the tongue are characteristic symptoms (Fig. 19). The tongue assumes a glossy appearance. Faisans reported an opalescent porcelainlike appearance of the dorsum of the tongue in influenza.



Fig. 17—Pyogenic granuloma of the tongue, papillary type
(Courtesy of Dr. S. G. Balkin)

Lesions of the oral mucosa believed to be due primarily to a deficiency of a specific vitamin have been reported. In a *thiamine deficiency* the lesions are characterized by the development of pinpoint vesicles occurring on the buccal mucosa under the tongue or on the palate. Lesions produced by a *niacin deficiency* occur on the tongue coexisting with a conjunctivitis. The tongue is coated followed by a patchy desquamation usually oval in shape the center of which is atrophic and the periphery is raised.



Fig. 18—Benign papilloma of the tongue.



Fig. 19—The "beefy" tongue of pernicious anemia. (Courtesy of Dr. Lester Hollander.)

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CHAPTER XIV

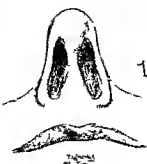
THE NOSE AND THE FACE

THE EXTERNAL NOSE is a characteristic and specific feature of man. It forms a projecting element of the bony structure of the nose and rises as a more or less reclining three-cornered pyramid from the face. Its shape is carried only in the upper section by a bony structure (nasal bones *ossa nasalia*) the root of its shape depends upon the nasal cartilages. The cartilaginous structure itself is not specific for human beings as it is found in the amphibia and reptilia and through the whole series of the mammalia although not in its projecting shape and not in its formation and high extension. Relatively the external nose is most developed in the gorilla. Its border from the forehead is marked by a distinct nasalsaddle. However the very large nostrils are turned toward the front the upper part forms only an incomplete covering of the inner nasal structure the extremely blunt point of the nose appears to be divided into two halves and the ridge of the nose appears to be grooved by a longitudinal furrow. Therefore the external nose in which the inner parts of the nose are covered is one of the most important differences between the human face and the faces of animals (Fig. 1).

The cartilage *septum nasi* is more or less responsible for the projecting shape of the nose whereas both of the *cartilagine nasales laterales* are responsible for the shape of the nasal ridge and the lateral surfaces of the nose.

The *cartilagine alares majores* consisting of two parts (*crus mediale* and *crus laterale*) form the tip of the nose the nares and partly the nostrils of the nose. The *cartilagine alares minores* composed mostly of two or three small platelets are located in the origin of the skin of the cheeks whereas between the cartilages of the tip and the lateral wall are irregular small cartilage platelets.

The general extent of the nose is in general due to the length of the nasal bones and of the *processus nasalis* of the frontal bone. It is due also to the height and width of the *apertura piriformis* thus a long narrow aperture corresponds to a long narrow form of the external nose. The relation of the height of the nose to the width shows great variation in human groups. Collignon and Topinard have stressed that the three types of the nasal index (*leptorrhine* corresponding to 55.0699, *mesorrhine* to 70.0840 and *chamærrhine* to 85.0999) correspond conspicuously with the so-called white yellow and black races. The American forms are more closely related to the Mongoloid forms than to



Thickness of the point of
the nose at the nostrils (WENINGER)

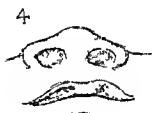
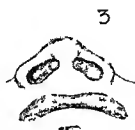


Fig 1—Diagrammatic representation of the soft surface of the nostrils
(After Topinard)

those of the European. *Leptorrhiny* is seen mainly in Europe in the Caucasus and in some East Indian regions. The Armenians have a 91 per cent high small nose mostly with a straight or convex ridge. The Kurds have a 95 per cent high nose. India, Central Asia, North Africa and America are the sections where *mesorrhiny* occurs mostly and *chamerrhiny* is particularly found in East Asia among the dark strains of India among Melanesians and Polynesians and especially among the Negroes of Africa. Many strains of the latter have to be arranged in the group of hyperchamerrhins.

The index of width and height is not always able to reproduce the impression of the physiognomy of the nose exactly because in some races the nasal saddle shows evidence of a marked concave curve. Therefore the deepest place does not lie at the root of the nose but in the middle of the nostril as for instance in Australians. Within the various groups there are marked variations of the nasal index (Figs 2, 3, 4 and 5).

The *external nose* changes its mass and shape because of the growth of the facial skeleton especially in the height of the frontal sinuses so that typical nasal forms of adults develop only during childhood and adolescence. The nose of a European child is characterized by its remarkable width and its lesser height and it reminds one of a chamerrhinum blunt Australian nasal form. During growth there develops from the chamerrhiny and hyperchamerrhiny of the child the leptorrhiny or mesorrhiny of the European. During the period of growth of the joints in the first nine years the change in the nasal form is mostly evident. This lasts in the average individual much longer—to about the twenty-fifth year of age.

In women the size of the nose is generally smaller than in men. The dimensional width and depth of the nose also correspond with the general development in height and width of the body. The leptorrhin evinces in the main a longitudinal narrow nasal base, the chamerrhin a low and broad base. The North American Indian is an exception having a high protruding and broad nose. The Eskimos too have relatively high and flat broad noses. The direction of the nostrils and their shape are in accord with the shape of the nasal base.

There are also typical differences in the form of the tip, the ridge, lateral walls and the root of the nose. According to Virchow the shape of the cartilage of the tip of the nose is partly responsible for the shortening of this tip.

The profile of the nose varies much in different individuals. There are three main forms: the straight, concave and convex forms. The so-called straight form is seldom absolutely straight. The concave form is

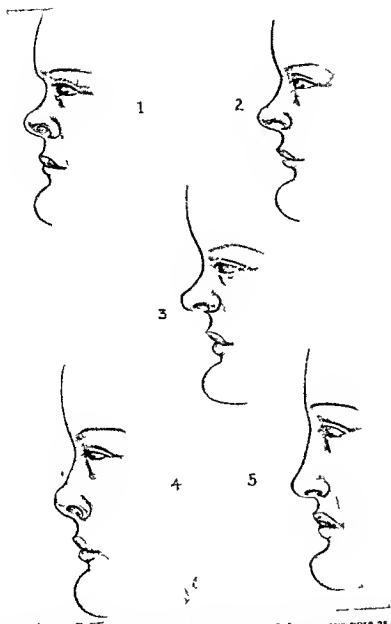


Fig 2—Diagrammatic representation of the form of the concave nose as seen in profile 1, Root deep, point directed upward, base directed anteriorly and upward 2, Back short, root moderately pointed, directed slightly anteriorly and upward 3, Back short, root moderately high, point directed anteriorly, base horizontal. 4, Back medium long, root moderately high, point directed forward, base directed forward and upward 5, Back medium length, root high, point directed upward base directed horizontally (After R Martin, *Lehr d Anthrop Fischer, Jena, 1928*)

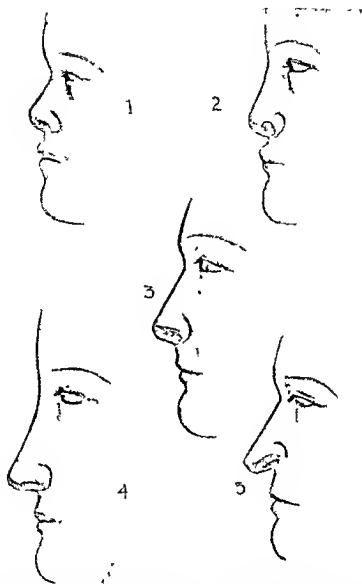


Fig. 3.—Diagrammatic representation of the form of the straight nose as seen in profile. 1, Back short, root deep, point directed upward, base directed upward and anteriorly. 2, Back medium length, root high, point directed upward, base directed anteriorly and upward. 3, Back medium long, root moderately high, point directed upward, base directed slightly anteriorly and upward. 4, Back long, root very high, point directed forward, base horizontal. 5, Back medium long, root moderately high, point directed laterally, base directed backward and upward (After Rudolf Martin, *Lehr d Anthrop Fischer*, Jena, 1928.)

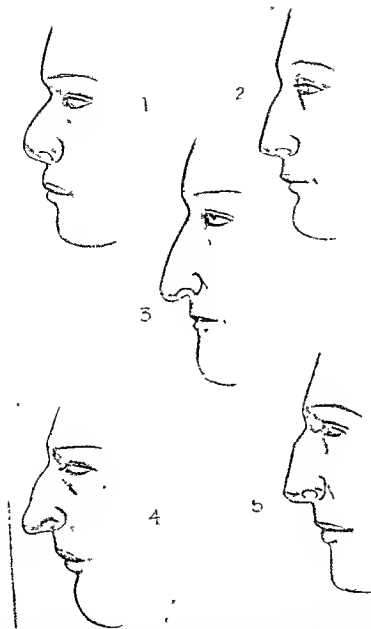


Fig. 4—Diagrammatic representation of the form of the convex nose as seen in profile. 1, Back short, root deep, point directed upward, base directed anteriorly and upward. 2, Back medium long, root moderately high, point directed toward, base directed slightly forward and upward. 3, Back long, root moderately high, point directed laterally, base directed backward and upward. 4, Back long, root moderately high, point directed forward, laterally, base horizontal. 5, Back long, root moderately high, point directed forward, base horizontal (After Rudolf Martin, *Lehr d Anthrop Fischer*, Jena, 1928)

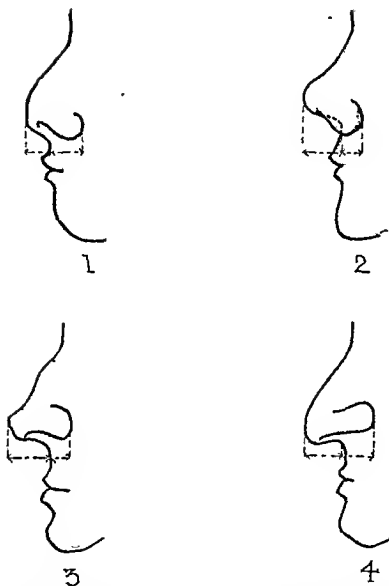


Fig. 5—Diagrammatic representation of the form of the nose as seen in profile. Profile forms of the region of the point of the nose (After Weninger, 1924) 1, Flattened, 2, rounded, 3, pointed, 4, point rounded. The position of the posterior root of the alae of the nose is shown.

usually found associated with a short nose. The straight or convex form is found more often in long noses. Even in primitive races with typical short blunt noses convex and concave noses are seen in the same proportion among the sexes; however the smaller nose of woman is more often connected with concavity than the larger nose of the male.

Fishberg proved statistically that among the Jews of New York the straight nose predominates very much over the convex form. Among 2836 male Jews and 1284 female Jews of New York he found among the former 57.3 per cent straight noses, 22.1 per cent convex, 14.2 per cent concave, and 6.4 per cent flat noses. According to Liejnek the percentage for male newborns among Polish Jews is 40.2 per cent with straight noses, 59.8 per cent concave, for newborn females 36 per cent straight and 46 per cent concave nasal forms.

The largest number of convex nasal forms are noted in Armenians and the North American Indian. The South American Indian shows evidences of straight nasal ridges. The concave form is found especially in the Bushman, Australian, and Laplander. During growth the form of the nasal ridge changes in accordance with change in the nasal form in height and width. We find the concave form more often in European children with broad short nasal forms than in adults.

The width of the nasal ridge also shows several variations. It may well be convex, concave, or straight, broad or narrow. The nostrils show evidence of characteristic variation not only as to their form and size but also as to their attachment to the skin of the cheek. There are great variations in the attachment of the nostrils depending upon the physical factors and the mobility of the nostrils.

The form of the root of the nose and the nasal bridge depend on the development of the glabella and on the length of the *processus nasalis* of the frontal bone. Flat high nasal roots are especially noted in Mongoloids, whereas low roots are found in Australians and most of the Negroids. The *septum nasi* is often perforated mainly in its cutaneous part by means of rings, sticks, and other ornaments which are stuck through an opening in the septum; the form of the nose is markedly changed thereby.

An important factor for the anatomical varieties of the nose (nasal ridge, root, tip, base of the nostril, etc.) is heredity, with crossbreeding exerting its influences; consequently mixed stripes result.

If the external nose has been destroyed and the nasal structure has been laid bare by disease, ulcer, or injuries, the covering mucosa discharging its secretion often presents an unsightly appearance.

Despite the slight mobility of the nose the movements occasioned by the muscles of the nose play an important role in expression. The cartilages of the tip of the nose do not move during breathing but the lateral parts being almost free of cartilages are sufficiently elastic to permit dilatation of the nostrils. The nose is elevated by the *levator alae nasi* muscle at the upper lip which is the most important voluntary motion of the nose. On the other hand the nose is depressed by the *musculus nasalis*. Elevating of the nose by the action of the levator muscle extends the nostrils while depressing it causes a narrowing of the nose.

The nose which is the main entrance of respiratory air does not show any visible movements during normal breathing while during difficult breathing its muscular actions are much in evidence e.g., in vitium cordis pneumonia high fevers or intense emotions.

Sudden perception of an unpleasant odor leads to involuntary holding of the breath. The contraction of the levator of the nose and of the upper lip causes these organs to become elevated and the nostrils enlarged. If the impulse to such contraction is very strong the region above the nose is also involved showing a transverse wrinkling at the root of the nose and the eyes are forcibly closed.

Mental depression is expressed by a drawing of the upper lip downward the lower part of the nose also is drawn downward and the nostrils are narrowed. In laughing the nose and mouth broaden. In melancholia these characteristics become distinctly manifest.

The skin of the external nose is relatively poor in fat and is closely adherent to the nasal cartilage especially at the lateral parts but it is more flexible over the bony structure and may be wrinkled here. In the nostrils the skin goes over into the inner mucosa. Sometimes especially in older individuals this region is covered with more or less coarse hair projecting from the nostrils.

Usually there is a certain correlation between the shape of the nose and other parts of the face. A big mouth and broad lips are often found together with a broad nose widely separated eyes and other coarse features of the face. A finely shaped mouth usually goes hand in hand with a fine structural nose with well formed eyebrows and well formed ears. The old Greek ideal of beauty of the nasal form is well known.

The profile of the nasal ridge is a straight line the triangular nasal cartilage is a straight prolongation from the nasal bone. A strictly symmetrical nasal form is seen only seldom. Classical sculptures show evidence of this asymmetrical feature as for instance in the Venus de



Fig 6—Acquired nasal deformity before and after operation (Courtesy of Dr. H. W. Penhale)



Fig 7—Fractured nose, anterior and lateral views. These must not be confused with the saddle nose of syphilitic origin shown in the following illustrations

NIL0 A deflected *nasal septum* is often the cause of difficult breathing (Fig 6) If the nasopharyngeal space and the inner nasal space are narrowed to such an extent that normal nasal breathing is disturbed permanent mouth breathing ensues this gives the face a characteristic expression Severe mutilations may be caused by ulcerations of the structures of the nose Syphilis also is responsible for several forms of



Fig 8—Saddle nose due to syphilis.

disintegration of the nasal structure The characteristic saddle nose presents a sunken appearance of the back nasal bridge (Fig 8) In rhinomegaly the nose appears grossly enlarged (See Chapter 1 Fig 5)

A reddened nose may be hereditary or it may be due to external irritation such as freezing or it may be due to alcoholism The nose assumes a peculiar expression if the muscle tone relaxes as in severe disease or during fainting spells under such circumstances the nose appears pointed Complete relaxation of the muscles in death displays this pointed nose feature distinctly the blood vessels empty and the lateral parts of the nose are thus further sunken in

Malformations and deformities congenital as well as acquired may influence the expression of the face to a marked and often distorting degree (Fig 9). Incomplete union of the processes entering into the formation of the face is responsible for congenital deformities malposition or maldevelopment of the respective parts. In *proboscis lateralis* half of the nose shows a normal form while the other half consists of a sessile short structure at or near the inner canthus of the opposite eye. Other malformations are observed in such conditions as *coloboma* of



Fig 9—Double development of the nasal septum with central groove through nose and median fissure of the upper lip and palate

the eyelid and absence of the intermaxillary bone and the nasal cavity on the deformed side.

In *Kundrat's cebocephaly* a rudiment of a nose with only one nostril is developed. The horizontal and vertical plates of the ethmoid, the optic foramina, the lesser wings of the sphenoid, the vomer, lacrimal bones, nasal cavity and intermaxillary bone may be absent. There may be fusion of the frontal lobes in the midline and maldevelopment of parts of the brain such as the olfactory lobes with consequent nasal deformity.

Acquired deformities caused by trauma or disease are more frequent than congenital deformities.

Rhinophyma is characterized by hypertrophy of the nasal structures. Atrophy is caused by *lupus*. Fracture may result in displacement of the membranous structures. Syphilis or abscess formation may cause sagging of the nasal bridge. Syphilis, tuberculosis, trauma and noma may be responsible for partial destruction or in severe cases complete destruction of the nasal bridge.



Fig 10—Basal cell carcinoma of nose



Fig 11—Carcinoma of the nose (Courtesy of Dr F E Simpson)

The skin of the nose may be affected from various causes. Heat, cold, trauma, and chemicals may cause *dermatitis*. Among *chemical irritants*, poisons of plants, animals, or inorganic substances may cause trouble. A pathologic condition of the skin of the neighboring parts of the face may spread to the nasal skin. Hemorrhages, inflammatory processes, hypertrophies, neoplasms, atrophies, infections of the facial skin may



Fig. 12—Osteosarcoma of nose

affect the covering of the nose. *Acne rosacea*, a chronic form, affects especially the nose, the lesions being acne and hypertrophy of the skin, hyperemia, and telangiectasis.

Fractures of the nose occur often because of the prominent position of the nose and its ease of accessibility as a target. The extent of the trauma varies. Malignant as well as benign growths are frequent. Of the benign neoplasms, fibroma is rare. When the growth reaches large proportions, it leads to pronounced deformity of the external nose. Papillomas arising from the nasal cavities or from the accessory nasal

sinuses are usually of firm consistency. Of the malignant neoplasms sarcomas may arise not only from the region of the turbinates but also from the septum or the floor of the nose (Fig 12). Among the symptoms are obstruction of the nose and recurrent attacks of epistaxis. Later when the growth reaches a larger size exophthalmos and widening of the bridge of the nose are observed. Carcinomas of the nose are more fre-



Fig 13—Sarcoid of the nose (Courtesy of Dr Lester Hollander)

quent than *sarcomas*. They are observed mostly after the fourth decade of life and arise principally in the area of the middle turbinate bone at the embryonic side of the outpouching of the sinuses. Nasal obstruction, mucopurulent discharge and occasional pain are among the early symptoms. The soft as well as the bony tissues ultimately break down, necrosis occurs and ulceration results. In the later stages of the disease the dura becomes affected. Cachexia is often pronounced (Fig 13).

Syphilis of the nose may be congenital or acquired. Symptoms of congenital nasal syphilis are usually observed from the second week to



Fig. 14—Gummatous destruction of external nose and septum



Fig. 15—Destruction of nose from syphilis.

the third month of life. Discharge is marked and the nasal mucosa is swollen and reddened. Obstruction of the nose is annoying. Sometimes the bones and cartilages of the nose also become affected. Symptoms of the later forms of congenital syphilis become manifest between the third year and puberty. The nasal mucous membrane shows gummatous infiltrations undergoing ulceration. Destruction of the bones and cartilages of the nasal framework is extensive. Sometimes perforation of the hard palate and grotesque deformity of the face result (Fig. 14).

Acquired syphilis in the primary stage seldom affects the nose. In the secondary stage there may be symptoms affecting the nose. The mucous membranes of the nose become reddened and frequently edematous. Discharge is marked. During the tertiary stage of the disease the nasal lesions affect the cartilaginous and osseous framework frequently involving the bones of the face and skull. These serious symptoms occur most often after a period of from five to fifteen years. The columella and even the whole nose may become destroyed. Deformities such as saddle nose, loignette nose, bulldog nose and parrot nose may result (Fig. 15).

Tuberculous of the nose is characterized by infiltration, ulceration, formation of abscess and tumor, perichondritis and periostitis. The nasal lesions are usually located in the septum, the lateral wall and the floor of the nose are seldom affected. Sometimes the infiltrated mucosa shows a granulated surface. This type of granulomatous infiltration has a predilection for the interior surface of the inferior turbinate. Later the middle turbinate, the upper struts, nasal floor and septum also become involved. Sometimes the pathologic involvement becomes so extensive that the external nares as well as the lips become affected. Sometimes perforation of the cartilage of the septum or of the perpendicular plate of the ethmoid ensues. If the granuloma is in a sinus, destruction of the bone causes enlargement of the osium. Adjoining sinuses and cavities may also become involved. The skin of the nose is often affected by *lupus vulgaris*. It is difficult clinically to distinguish lupus of the nose from other forms of tuberculosis. Usually it starts early in life between the fifteenth and thirtieth years of age and affects the female sex principally. Most cases of lupus of the face show also involvement of the mucous membranes.

Rhinoscleroma, a chronic granulomatous process, is rare in America but is often found in central Europe. The nose as well as the upper lip is a site of predilection. The disease progresses very slowly. Sometimes but not often changes in the external nose are seen. Usually the area of the anterior nares and upper lip is affected beginning with

firm subcutaneous plaques and later developing into smooth or lobulated tumors

Hematoma of the nasal septum is caused mostly by trauma. The hematoma may become absorbed or infected. In the latter instance an abscess of the septum may result. Malignant tumors after development and destruction of the nasal cavity, cause distorting deformities of the face. *Cancer of a sinus* progresses slowly but seldom metastasizes. Among the various symptoms are unilateral obstruction of the nose, headache (mostly frontal), discharge from the nose, hemorrhage, involvement of the cranial nerves and ophthalmologic disturbances. A suppurative process affecting the *frontal sinus* may affect the sinus wall and extend into the orbit, the cavity of the nose or cranium. When the orbit is involved the upper eyelid becomes edematous and reddened. Acute frontal sinus disease may be followed by osteomyelitis of the skull. Chronic inflammation of the frontal sinus may result from acute frontal sinusitis or through infection extending to other sinuses.

Nasopharyngeal fibroma is observed mainly in adolescent male patients. The principal symptoms are nasal obstruction and hemorrhage. Obstruction of the nose depends upon the size of the growth. Due to mouth breathing the facial expression is very often of the adenoid type. When the growth extends to the base of the skull ocular and mental changes may develop. If the growth extends into the accessory nasal sinuses, the lateral wall bulges and pressure may cause separation of the superior maxillary bones. Proptosis and the so called "frog face deformity" result from extension into the orbit.

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CHAPTER XV

THE EAR AND THE FACE

THE ear which is more or less visible by looking at the face front or profile view comprises the *external ear the auricle and the external auditory meatus*. The auricle so-called because of its conchoid shape represents a cutaneous fold mainly supported by cartilage. It surrounds the orifice of the external auditory canal reaching as far as the back the top and even the bottom above this orifice. From the front the entrance to the external auditory canal is arched by the *tragus* a short tense fold also supported by cartilage. The orifice however is not completely covered toward the outside by the *tragus*.

The *auricle* shows peculiar relief landmarks seldom found on any other part of the body which lend the ear a peculiarly characteristic appearance.

The auricle possesses a free padded ridge at the top bottom and back. The convex arch which borders the auricle at the top back and bottom leaves the auricle completely free. The lower part of the auricle varies considerably in regard to extension as well as in individual form. This free lower part the *lobulus auriculæ* in general appears as a cutaneous reduplication of tissue rich in fat without cartilaginous support of different shapes and development.

The free ridge of the auricle may be directed more or less laterally or bent toward the concave side of the auricle. The *helix* comprises not only the free upper and back ridge of the auricle as far as the *lobulus auriculæ* but also the upper part of the frontal ridge attached to the auricle. The auricle continues as the *upper helix*. This is usually limited by a sharp backward fold and forms the *helix ascendens anterior* which has its origin at about the center of the concave auricular surface either as a horizontal ridge running from the back to the front or as a sharply edged *crus helicis* which runs into the ascending helix in different shapes about the center of the anterior aurular ridge. The ascending helix is continued as the *helix superior* and *helix posterior* or *helix descendens* to the *lobulus auriculæ*. On this particular part is found a thickening or a pointed prominence mostly in the upper part of the helix (*tuberculum apicale apex auriculæ*). This is of special morphologic interest since this part of the human ear is said to correspond to the tip of the ear in animals which was at first explained by Darwin as

an atavistic form (*Darwin's ear*) (Fig 1) Later on Darwin's conception was challenged mainly because of a confusion of this part with another pointed form (parietal point) which can be found often

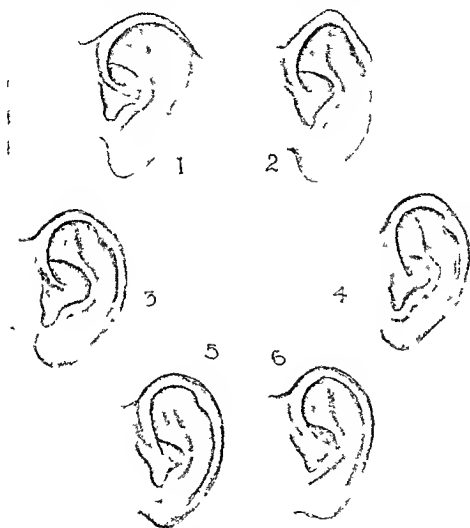


Fig 1—Diagrammatic representation of the development of Darwin's tubercle (after Schwalbe) 1, Macacus type 2, Cercopithecus type 3, Tubercle pointed 4 Tubercle rounded 5, Tubercle indicated 6, Absence of tubercle (After Topinard)

on the human ear, but at the highest point of the aural ridge Both of these points can be found on the ears of five and six month-old embryos The closest apelike ear observed in man reminds one strikingly of the ear of the ape (*Macacus* and *Cynocephalus*).



Fig. 2—Voluntary action of postauricular muscle retracting and elevating the ear. The same individual displays voluntary control of frontal and nasal muscles. Compare distance a-b and c-d when muscles are at rest: the former 1.8 cm., and the latter 4.9 cm.

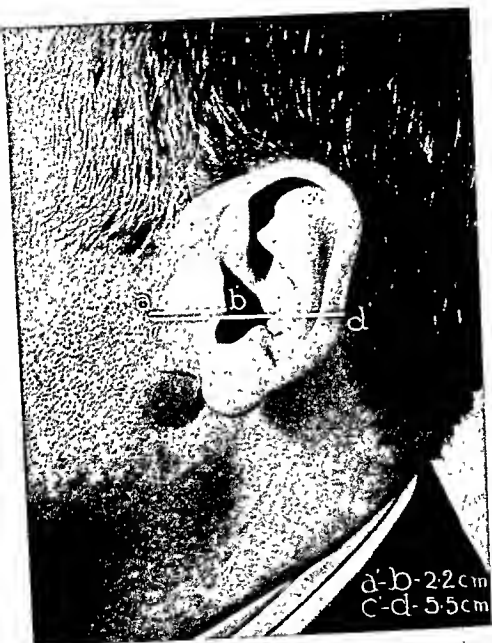


Fig. 3—The muscles are contracted. Note distance from a b, 2.2 cm., and from c-d, 5.5 cm., showing extent of displacement.

The *anthelix* begins inside the upper anterior part of the ridge of the helix with two rigidly developed *crura anthelicis*, which converge to form the *truncus anthelicis*, which runs above the lobulus auriculæ into a strong prominence the posterior rural valve or the *antitragus*. The two *crura anthelicis* consist of the upper crus (*crus anthelicis superius*) which forms so to speak a continuation of the *truncus anthelicis*, and the *crus anthelicis inferius* which describes a gently shaped S. The end of the anthelix terminates in the *antitragus*. The anthelix is separated from the antitragus by a weak depression or a deep furrow (*sulcus auriculæ posterior, incisura anthelicis*). The *incisura intertragica* is found between the tragus and the antitragus. The *sulcus auris anterior* abuts the tragus. Above the tragus prominence another less strongly developed tubercle (*tuberculum supratragicum*) is found.

At the lower end of the helix the lobulus auriculæ is separated by a furrow (*sulcus heliculobularis*). Frequently this furrow together with the one which separates the stem of the anthelix from the antitragus are found together (*sulcus auriculæ posterior*) forming the *sulcus obliquus* of His.

Below the inferior crus (*crus anthelicis inferius*) the *fossa praecarinalis* passes into the *auricular cavity* (*concha auris*) which is incompletely divided by the crus helix into a smaller upper part (*cymba conchæ*) and into a larger part (*carinas conchæ*). At the anterior edge of the *cavitas conchæ* the external auditory canal begins in front more or less covered by the tragus.

An important anthropologic index is the so-called *ear index* of *Lopinard* the physiognomic ear index. It varies much in men between 50 and 78 and in women between 15 and 74.

Frigerio ascertained a greater length of the entire auricle in criminals and mentally diseased as compared with normal persons. Wilhelm found just the reverse. However both these investigators observed a greater total width of the ear in normal persons than in mental patients and criminals.

Summarizing we can say that the normal ear reveals a well curved bordering line satisfying from the aspect of beauty or æsthetic judgment never especially protruding or irregularly bordered from the anthelix by a distinctly scaphoid fossa with well bordered helix lines in ideal ear which seldom occurs. Its anthelix which should not protrude too much should have well developed double furrowing at the upper end. The lobulus auriculæ should be well formed. The total size of the ear should not extend more than 2½ inches in height and 1½ inches in width in the average adult.

It is frequently stated that the greatest length of the ear of adults corresponds to the length of their noses. In the child and fetus the nasal length is shorter than the aural length.



Fig. 4—Outstanding ears

Anomalies of form of the auricle have often been given as characteristic for mental patients and criminals. The characteristic individual form of the auricle plays an important role in criminal law for the purpose of identification. Variations may be shown in manifold combina-

tions and changes in relief development and configuration of various furrows. Variations of the lobule likewise find expression in many ways. In rare cases it is notched or more or less split. This anomaly is described according to the degree of separation (split or double aural lobule *coloma lobuli auriculæ*). The lobule as a whole may be very large. It is rarely missing entirely. The lower end of the ear as in apes is supported at its free edge by cartilage. The lobule may be prolonged onto the cheek. Gradenigo observed this more frequently in criminals than in normal persons.

The position of the auricle in relation to the rest of the parts of the ear as well as to the lateral surface of the head may vary equally. Its level may be either arched parallel to the lateral surface of the head or medially toward the inside or laterally toward the external surface.

Variations of the position of the entire auricle are also observed. The widely protruding ears are stated by Lombroso to be characteristic of mental patients and criminals. Gradenigo gives the following incidences: normal males 111 per cent, mental patients 20 per cent, criminals 25.2 per cent; normal females 31 per cent, mental patients 4.2 per cent, criminals 5.3 per cent. The relatively much smaller number of protruding ears in the female may possibly be due to the early use of ribbons, caps, etc. *Asymmetry in shape and size of both auricles* is frequently observed. Perfectly symmetrical right and left ears rarely occur. On the other hand the more obvious anomalies are usually bilateral (fig. 4).

The auricle also depends upon racial peculiarities. The ears of females are generally smaller than those of males. In races with large defective ears with a rolled in edge of the helix (Europeans, Mongolians) animal-like tubercles occur more frequently than in races with small strongly rolled in ears (Bushmen, Negroes). Markedly protruding ears seem characteristic for the Kalmuks and Turkmenians.

The auricle is in the main supported by a cartilaginous plate (*cartilago auris externæ*) which is connected with the external auditory canal. Bands of fibrous connective tissues are intimate with the perichondrium of the aural cartilage, the so-called bands of the auricle. Under the skin covering are found a few small striated muscles.

The skin of the auricle is intimately connected with the position on the concave surface, while on the lateral, convex and medial surfaces it is attached to the cartilage by a subcutaneous layer of tissue of elastic fibers which permit it to be shifted above, below and at its base. The distribution of fatty tissue is singularly varied; for example, there is no fat in the cymba conchæ, at deep places of the concha propria on the

cus anthelicis inferius the summit of the fold of the anthelix and the medial surface of the tragus while it is but scantily present at both slopes of the anthelic fold in the fossa navicularis and triangularis as well as in the remaining region of the concha propria. However the subcutaneous connective tissue of the convex surface contains fat as do the lateral free surfaces of the tragus and antitragus. The lobule which



Fig. 5—Congenital cat ears

is free from cartilage is especially rich in adipose tissue. Delicate hairs with their sebaceous and sweat glands are found on the surface. Hairs are extensively distributed at the tragus and antitragus as well as in the incisura intertragica. They increase in advanced age particularly in males.

Frozen ears display swelling and redness of the auricle. Loss of substance at the edge of the auricle is observed in high degree freezing so that the edge appears gnawed in outline after recovery. Frequently external injuries lead to mutilation of the auricle. Tuberculosis and carcinoma may afflict the *lobulus auriculæ*, especially in advanced age.

Wearing of heavy ear ornaments i.e. wooden plugs chains bones and other articles as observed among savage peoples causes abnormal stretching of the lobule of the ear. Deformities of the lobule are widely encountered among various peoples



Fig 6—Microtia. (Courtesy of Dr V. H. Kazanjian)

Some persons are able to move their ears voluntarily (Figs 2 and 3). Often in trying to hear the hand is put to the ear to assist the auricle to amplify the sound.

A minor form of anomaly, the *lack of the concha*, is characterized by the arching of the convex *cyma conchae* instead of the concave groove. In the so-called *Hildermuth ear* the ridge of the anthelix protrudes abnormally laterally above the plane of the helix. In *Stahl's ear* there

is an abnormal ridge which exerts a pull from behind upward through the scapha to the helix

Among other abnormalities may be mentioned the *triple division of the anthelix* which is caused by an abnormal development and horizontal course of the crus helix to its connection with the anthelix The so-called *cat's ear* is characterized by downward direction of a portion of the ear (Fig 5) This may be manifest in differing variations and transitions of an abnormal rolling in of the helix up to marked malformations of the auricle to an agglutination of the tragus with the turned down helix



Fig 7—Supernumerary auricle in neck (Gould)

Congenital fissure of the ear may also show in various degrees More frequent than in apparently double lobule are various degrees of *notchings* Abnormalities in the outline of the helix and the folds of the ear appear especially in the upper part An abnormally small auricle is known as *microtia* (Fig 6) *Displacement of the ear* into the region of the maxillary joint or still further onto the cheek toward the mouth is spoken of as *melotus* Auril malformations may occur simultaneously with other deformities Mechanical influences *in utero* may be responsible for some such deformities (Fig 6)

Anotia is a complete absence of the auricle. Such cases are rare. The deformity may be unilateral or bilateral. By *otapostaxia* we understand the abnormal upright position of the ear; it is not rare.



Fig. 86.—Natural ear flaps from protruding ears. (Courtesy of Dr. Lester H. Hander.)

Auricular appendices are humpy or lobulike formations situated near the auricle. The auricle itself may under such conditions be of normal shape or deformed. Appendices may be attached to the cheek in front of the ear and may sometimes be connected with the trigus or *helix ascendens*. They vary in size from wartlike smaller formations to larger tumor lobules. They are frequently multiple, sometimes ar-

ranged in a line running from the external aural opening toward the angle of the mouth. Auricular appendices are often associated with deformities of the maxilla as well as fissure formations of the face. In the latter



Fig. 86—Natural ear rings from piercing ears. (Courtesy of Dr. Lester Hollander.)

instance it is the diagonal malar fissure with which they are combined most frequently. They may produce the effect of a supernumerary auricle. True *polyotia* (the occurrence of a supernumerarily developed auricle) is however very rare (Fig. 7).

A variety of *congenital fistulae* may be encountered in the region of the ear the most frequent of which is the *fistula auris congenita* which is characterized by a fine canal of only a few millimeters in depth situated in front of the *helix ascendens*. Fistulae of considerable length are rare. Such fistulae may discharge a secretion temporarily or per-



Fig. 3.—Rudimentary ear. Congenital defect (Courtesy of Dr. Lester Hollander.)

manently which is sometimes accompanied by an eczematous condition in the vicinity of the fistula. Cysts and otheromatous formations at the ear do occur if these suppurate. Abscesses may develop which are at times of considerable size. In deformities of the ear one may often observe an asymmetrical development of the face in such instances the half of the face corresponding with the aural deformity is smaller.

Neoplasms of the auditory canal are not rare. *Fibromas* may originate at the auricle or in the auditory canal. *Xeloids* may develop at the

lobule after piercing the ears (Figs 8a and 8b) The following have also been observed *myxofibroma*, *fibrochondroma*, *chondroma*, *chondromyoma*, *lipoma of the auricle as well as the auditory canal* *Osteoma* may be found at the mastoid process *Hemangioma* appears in form of *telangiectases (aneurysm)* at the auricle and the auditory canal, the middle ear and the meatus internus *Lymphangiomas* of the auricle and the middle ear are also observed *Warts* and *papillomas* are not



Fig 10a—Lope ears (Courtesy of Dr V H Kazanjian)

infrequent at the auricle and in the auditory canal, and may be transformed into epithelial tumors *Papillomas* may be pedicled or cauliflower like growths, *condylomata acuminata* The latter forms occur especially in the Chinese, because of their customary mechanically irritating manner of cleaning the auditory canal

Carcinomas of the auditory canal and the middle ear are fortunately infrequent, they are usually very malignant The auricle, auditory canal, as well as the middle ear, may be afflicted with *sarcomas* Occasionally benign tumors may become malignant

Lederer points out that the contour of the ears has a tendency to be familial. Defects may range from a closure of the canal by a diaphragm or from a small tubercle on the helix to complete absence of the auricle or obliteration of the canal (Fig 9)

A great many conditions may be described under acquired deformities and defects. Such conditions are classified as *erosions, cuts, punc-*



Fig 10b—Left sided mastoiditis. The auricle appears to be hanging on the side of the head being pushed downward and forward. (J. C. Keeter. Modern Otolaryngology.)

tured wounds, tears and partial or total losses from explosions, burns, accidental wounds and animal bites.

Burns of the ears may be produced accidentally by thermic chemical or electrical factors (*dermatitis calorica*). Such accidents as scalding by water or superheated steam, hot oils or fats, acids, explosive powders and electrical wires are not uncommon. A fifth degree burn results from exposure to live wires or explosive powders.

Hematoma (hematoma auris) is not uncommon among pugilists and athletes who are subject to direct trauma from blows to the ears. Some cases have been described as spontaneous or idiopathic in nature. A single trauma leading to hematoma may leave the individual with noth-



Fig. 11—Cauliflower ear.

ing more than a less elastic ear while repeated trauma to the ear may result in cauliflower or tumor (Fig 11)

Acute perichondritis should be considered as a serous or suppurative exudation beneath the perichondrium of the ear. In the former case the serous exudate is clear and of a yellowish color and the etiologic factors are often stated as idiopathic because the history of trauma is uncertain or too slight to be emphasized. Poor nutrition, syphilis and endarteritis obliterans have been stated as causes of *perichondritis serosa*. The suppurative type often associated with abscess formation has a distinct history of either direct infection or trauma. Incised or punctured wounds, burns, frostbites, plastic procedures, hematoma, dermatitis, eczema, suppurative otitis media, furunculosis or syphilis may cause inflammation of the perichondrium.

The external ear may be affected by the diseases of any other skin covered organ. The process may be limited to the auricle itself but usually extends from the scalp, face or external auditory canal. *Erysipelas* may occur as a grave infection with subcutaneous abscess formation. It is frequently a complication of mastoid surgery appearing a few days after the operation and observed during the dressing of the wound.

Impetigo contagiosa may occur on the ear or be associated with lesions of the scalp. It is seen in conjunction with scabies or with skin involvements of the face but it is often secondary to aural discharge. The disease is usually finger borne and is common in infancy and early childhood when hygienic environment is poor.

Eczema of the external ear may occur as an extension from the auditory canal or face especially in infants and young children. The process may be acute, subacute or chronic, moist or dry, manifest as a single lesion or as a combination of predominant lesions such as erythema, papules, vesicles and pustules. *Erythematous eczema* is frequently seen in middle-aged and older individuals. The ears become affected by extension from the face. *Papular eczema* appears chiefly on the posterior part of the auricle. *Vesicular eczema* is the most typical form occurring on any part of the body. The face and scalp of infants, however, are the most common sites and the ears may become involved by extension. *Pustular eczema* is seen on the scalps of infants, often developed from the vesicular type. This form is seen particularly in young, ill-nourished individuals suffering from tuberculosis, rickets or anemia. Pustular eczema of the scalp and behind the ears is often the result of pediculosis.

Herpes zoster oticus is an acute inflammatory disease of the auricle in which circumscribed blisters are found along the distribution of the

sensory nerves. The lesions are the result of an acute infection of the cranial ganglia. Eruptions on the anterior surface of the ear are significant of involvement of the auriculo temporal (fifth) nerve, while eruptions on the posterior surface and lobule imply a greater auricular (third cervical) nerve inflammation. While the fifth, seventh, and eighth nerves may suffer at the same time, and all the nerves from the fifth to the tenth may be involved, vestibular symptoms are marked in some cases with secondary involvement of the auditory part, or *vice versa*. Paralysis may result from involvement of the facial nerve and its branches. Herpes zoster oticus is usually a unilateral and self-limiting disease.

Tuberculosis of the auricle is a very active and destructive process. The affection results primarily from traumatic erosion of the auricle, or the canal, is finger borne or occurs by extension from neighboring parts. There is a doughy swelling of the entire auricle, though often only smaller areas are involved in perichondritis. The lymph nodes (preauricular, postauricular and infraauricular as well as the deep cervical) are often swollen and tender. *Lupus vulgaris* is characterized by the frequently described "apple jelly" tubercle, having a tendency to break down, heal with marked scar formation at one site and go through the same evolution in another. Lupoid changes about the ear are often associated with visible distribution of lupus about the face.

Primary syphilitic infection of the auricle is not common, although the external ear is subject to attack by all forms of syphilis. The secondary and tertiary lesions are commoner manifestations. The external auditory canal is seldom the seat of primary, or tertiary syphilis, but when they do occur they do not differ from those appearing elsewhere. The deformity of the scar varies in extent with the lesion. The opening to the canal may become cicatrized, with loss of substance of the cartilage leading to complete shriveling of the ear.

Leprosy of the external ear is usually associated with the disease elsewhere in the body. The ear, however, is a favorite site for the propagation of *Bacillus leprae*, the nodules apparently having a predilection for the lobe.

All types of benign and malignant neoplasms originating from any of the component parts, such as the skin, cartilage, glands, and vessels, may be found on the external ear (Fig. 12).

The posterior surface and the lobule are the most frequent locations of cysts of the auricle. They are usually sebaceous, due to blockage of the glands containing hair and epithelial masses. Dermoid cysts are found occasionally.

Elephantiasis or *lymphangioma of the auricle* may occur about the pinna with enormous increase in size of the auricle.

The external ear and its neighboring structures may be involved by *telangiectases*, *varices*, *ecchymoses*, *nevi* and *pseudoangiomata*. Varices



Fig. 12—Keloid of the ear. (Courtesy of Dr. F. F. Simpson.)

of the external ear have been observed during pregnancy but tend to disappear during childbirth. The angiomas are usually preceded by telangiectasia and are due to freezing and stasis. Nevi about the ears are found in the tragus or lobule and have the same characteristics as similar lesions on other parts of the body.

Malignant lesions are most often epitheliomas of a squamous-cell or basal-cell type. About one third of the lesions are of the basal-cell type.

and produce destruction by extension to the entire auricle the external auditory canal parotid area and mastoid. The typical lesion is a small ulcer or abrasion with firm undermined edges or a crusted area like a senile keratosis. Upon removing the crusted area the sore bleeds red.



Fig. 13—Epidermal carcinoma of ear (Courtesy of Dr. F. E. Simpson)

ily. The common sites for the lesion are the tragus, the border of the helix, and the meatus. The development of these lesions is quite insidious. The facial nerve is endangered when the parotid region is involved (Figs. 13, 14, and 15).

Sarcoma rarely occurs as a primary lesion of the auricle. It has a tendency to involve the deeper structures, especially bone.

The most characteristic objective sign of gout is the tophus present in the ears. Its significance as a diagnostic criterion is great. Its recognition is of paramount importance. It is therefore essential to inspect the ear for tophi in individuals suspected of suffering from gout.



Fig. 14—Carcinoma of the ear (Courtesy of Dr. F. E. Simpson.)

Lewellyn states:

*Tophi in the ears or at other sites sometimes antedate articular out-
breaks. Now given that an individual exhibits auricular tophi, one or
many can anyone deny that he is gouty, nay more that he has gout*



Fig 15—Destruction of ear from carcinoma.

this even though he never has had or may never have an articular outbreak? In truth the eruption of a tophus in the ear is as essentially a fit of gout as if it had occurred at the classic site the big toe.

How vivid the light then thrown upon the import the etiological significance of otherwise inexplicable functional derangements! How grim the potentialities of e.g., dyspeptic symptoms as revealed by detection in the subject of a tophus! Whether viewed from the diagnostic or prognostic aspect its importance cannot be overestimated. *For let us not forget that the tophus is the one incontrovertible token of the gouty diathesis! This morbid localization is the sole outward expression of the inward and dominant pathological trend.*

The great Charcot did not despise its aid. He narrates the case of a man 35 years of age a sufferer for some months from acid dyspepsia in whom he predicted a fit of gout from noting an uratic concentration in one ear. Is not the moral obvious that in an individual complaining of gastric or hepatic disturbances etc. we should at any rate examine the ears for tophi?

Tophi sometimes precede by some years the development of gouty attacks in joints. The same is true also of articular tophi (Duckworth).

Llewellyn continues. Moreover they may not be solitary but numerous the cutaneous gravel of older authors. In truth these cases of tophi uncomplicated by articular lesions seem to merit some distinguishing term representing as they do a purely extra-articular form of gout. They constitute what might be termed primitive elemental gout of which the subsequent articular outbreaks are but an extension a further manifestation of the gouty diathesis. For it is just this same tendency to uricosis or deposition of sodium bicarbonate and thus alone that to our mind constitutes gout this primordial vice of nutrition not the congeries of distempers that with the passing ages have clustered around the primitive gout well nigh submerging its identity.

Premontory symptoms of tophus formation are important. While tophi may antedate articular attacks we do not always meet with them as mature concretions easily recognizable as such. We must have regard therefore to the symptoms and signs indicative of their impending eruption. Consequently in a patient complaining of the various functional disturbances that so frequently anticipate gout we should never dismiss as trivial any complaints of pricking or tenderness of the ears.

Sometimes the pain in the ears is acute the tenderness such as for bids their pressure on a pillow. Graves of Dublin not only noted that the pain in some instances was agonizing lasting a few hours but he

himself suffered also from such attacks of auricular pain, which only disappeared when gout supervened in his fingers. I have myself frequently known pain and soreness referred to chilblains, though later their tophaceous nature was disclosed.

Some observations of Trousseau are well worth quotation: "Physicians who have watched the progress of the evolution of tophus believe that it is formed during the paroxysm of gout. They are mistaken. The deposit appears during the interval between attacks, or at least when the attacks have not been of long duration, and when they do not recur in such rapid succession as to run into one another, in which cases their secretion has commenced during the preceding and continued during the succeeding attack."

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CHAPTER XVI

THE FACE IN PHYSICAL DIAGNOSIS AND IN INTERNAL DISEASES

THE simple inspection of the face is of greatest importance to the physician in clinical diagnosis. Notwithstanding or perhaps as a result of the availability and simplicity of the procedure the fullest use is not always made of this possibility. By a careful study of the face alone not only can considerable information be obtained on the general physical status of the patient but even the particular ailment from



FIG. 1.—Parkinsonism (Jelliffe and White "Diseases of the Nervous System"
Lea & Febiger)

which he is suffering can be diagnosed frequently although it may not be a local disease or one restricted to the face.

So typical indeed are some of the facies or facial expressions in disease as to make evident at a glance the condition with which the patient is afflicted. Thus the physician is enabled to diagnose on mere inspection the masked frozen facies of post-encephalitic parkinsonism (Fig. 1) the suggestively oriental features of the mongolian idiot (Fig. 2) the thick coarse face of the cretin with the protruding tongue (Fig. 3) and as previously stated by the play of facial expression or its ab-



Fig 2—Mongolian idiot Patient 12 years of age

sence the mental as well as the emotional status of an individual often becomes manifest.

The general state of physical health and nutrition is clearly evidenced in the face. The full firm cheeks of those in robust health contrast



Fig. 3—Cretin with protruding tongue

strongly with the sunken cheeks and temples of the emaciated victim of far advanced cancer on whose wan darkened face is cast the shadow of death (Fig. 4). By the color of the face one may surmise the presence of anemia almost diagnostic in itself is the typical lemon yellow pallor of pernicious anemia. Equally obvious is the markedly flushed face of

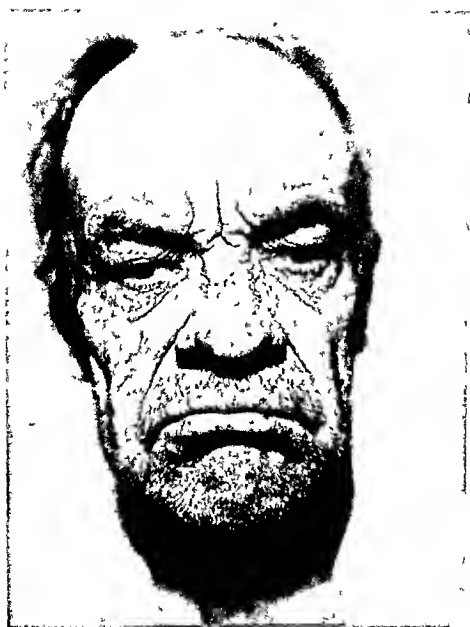


Fig 4—Gastrointestinal cancer. Slight cachexia with emaciation. Marked secondary anemia (lips). Depressed expression.

polycythemia and pruritus argyrous and cyanosis are evident even to the unpractised eye of the layman. Likewise revealing to the physician are the hectic flush of active pulmonary tuberculosis and the malar flush of mitral stenosis.

The history of past diseases may occasionally be read by the telltale scars they have left. Unmistakable are the ugly pockmarks of smallpox almost a medical rarity now and triumphantly so in these days of rigid prophylaxis. The atrophic whitish shallow scars of chickenpox and the dilated follicles and residual scarring of adolescent acne also leave their marks on the face. The latter condition if severe may constitute a definite psychologic hazard leading to difficult social adjustment. Rhinogrades or fine scars radiating from about the corners of the mouth bear mute testimony of a congenital syphilitic infection. Even the vocation of a person may be inferred *a la* Sherlock Holmes by a study of his face. Thus the swarthy weatherbeaten wrinkled face of the farmer proclaims his occupation as do the bluish tattooed marks of the coal miner.

General disorders as previously stated can sometimes be diagnosed by observation of the face. The generalized puffiness of the eyelids and face together with the pasty complexion of acute glomerulonephritis and nephrosis constitute a rather typical picture; however at times it must be differentiated from the edema of trichinosis which has a predilection for the eyelids. In trichinosis however the accompanying gastroenteritis muscle pains and tenderness together with the history of eating insufficiently cooked pork generally make the diagnosis evident which is clinched beyond doubt by the demonstration of the encysted *trichina* larvae in a muscle biopsy. Angioneurotic edema and dermatitis venenata must also be considered in the differential diagnosis of generalized facial swelling.

A generalized swelling of the face also occurs occasionally in some of the eruptive fevers. Thus in measles when the eruption is at its height the features may be so swollen as to be virtually unrecognizable. In pertussis or whooping cough too a bloated appearance of the face is sometimes observed. It is most marked about the eyes because of the laxity of tissues and due to the constant congestion from the coughing paroxysms.

While perfect symmetry of the face is so uncommon as to be regarded the exception rather than the rule gross inequality of the two sides of the face so marked as to be conspicuous even on casual examination is of course pathologic. This may arise from various causes. It may be due to either an atrophy or an hypertrophy affecting one or the other side of the face. Other conditions to be sure such as facial paralysis

with degeneration of the facial nerve and congenital torticollis are also characterized by an asymmetric appearance of the face. In congenital torticollis or wry neck the head is directed toward the sound side with the chin uplifted. To maintain the visual axis in a horizontal plane compensatory changes must necessarily take place giving rise to the asymmetry of the face which does not develop as rapidly on the affected side.

Facial hemiatrophy may be of the progressive or the non progressive congenital type. In either case the face appears as though composed of the lateral halves of the faces of two different individuals with a sharply demarcated vertical line of junction in the middle. The hair on the atrophic half of the face may be thin, white or absent altogether; the eye is deeply recessed; wrinkling or other alterations in the skin texture are readily discernible. The congenital type results from a congenital hypoplasia of the face for some unknown reason and an associated retardation in growth on the affected side subsequently occurs. The progressive variety of facial hemiatrophy or *Romberg's disease* generally occurs quite insidiously in girls before puberty. The atrophic process involves the bone as well as the soft tissues, such as the skin, subcutaneous fat, muscle and connective tissue; even the tongue on the affected side may become involved. The process is slowly progressive, starting anywhere but generally around the angle of the mouth or the cheek. It originates as a localized wasting that gradually spreads until the entire half of the face is affected. The teeth as well as the hair may come out on the involved side. This obscure and rather rare condition may accompany *scleroderma*, *syngomyelia* and *infantile hemiplegia*. The process is in some instances associated with a contralateral atrophy and pigmentation of the trunk and limbs. Bilateral hemiatrophy has also been reported. Trauma and pain of trigeminal distribution have in some cases preceded the onset of the hemiatrophy. True facial hemiatrophy never results from facial paralysis and is believed to be a disease of the vegetative nervous system. Occasionally only the subcutaneous fat may be involved and it must then be differentiated from the extremely rare progressive lipodystrophy in which there is a loss of subcutaneous fat above the waist with an increase of it below.

Facial hemihypertrophy as the name of course implies is the antithetical condition characterized by hypertrophic changes in the soft tissues and bones on one side of the face. It is a very rare, slowly progressive condition which finally comes to a standstill (Figs 5a, 5b and 5c).

In *osteitis deformans* the face is triangular, with the base directed upward owing to the thickening of the bones of the cranium. The head is carried in a position of forward inclination (Fig. 6).



Fig. 5a—Hemihypertrophy with vascular nevus (Courtesy of Dr. Lester Hollander)



Fig 5b—Hemihypertrophy with vascular nevus (Courtesy of Dr Lester Hollander)

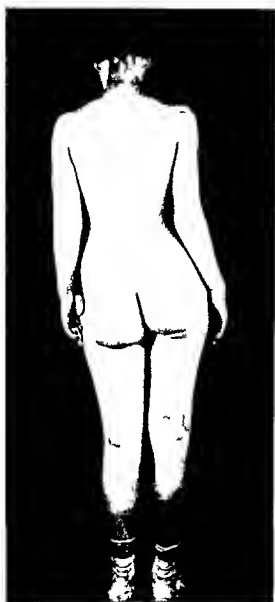


Fig. 5c—Hemihypertrophy with vascular nevus (Courtesy of Dr. Lester Hollander)

Leontiasis ossium is characterized by progressive enlargement of the cranium and face beginning usually in the superior maxillary bones and involving the maxillary and bones supraorbital ridges and rarely the mandible (Figs 6 7a and 7b) The face has a peculiar lionlike expression hence the name *leontiasis*



Fig 6—*Leontiasis ossium* (From Thomas Kurt H. Clinical Pathology of the Jaws Charles C Thomas Springfield Ill 1934)

A familiarity with the appearance of a mouth breather is of great importance because of the serious results (anemia gastric disorders phthisis etc) which may follow in neglected cases if the causative factors are allowed to exist during the developmental period If the condition has lasted for a considerable time years perhaps the nostrils are small and the nose itself relatively insignificant in size the mouth is large and constantly open the lips are thick and dry the eyelids droop and the expression is stupid and vicious *Adenoids* cause this characteristic facies Persistent vomiting gives the face a drawn pinched anxious look

The characteristic facies of *cachexia* is noted in wasting diseases especially in the late stages and when there are pain and anemia. This appearance is sometimes noted in cirrhosis of the liver with a yellowish tinge to the sclerae and skin and watery eyes.

It is not surprising that the liver has more or less part in all metabolic disturbances and that its functions as well as the state of its tissues



Fig. 7a—*Leontias osseum*. Picture taken before enlargement of head and neck began. (Starr.)

are implicated in metabolic diseases due to the important role that the liver plays in the cooperation of the organs of the human body.

If the biliary flux into the intestines is tied up it can have various causes. The pressure in the bile-ducts exceeds that of the blood vessels and the bile enters into the blood. The skin accepts characteristic yellow coloring, the main symptom of *icterus*. This skin color can attain the most varying shades from light greenish yellow to deep brownish yellow. Great discoloring of the skin characterizes *icterus melas*, *black jaundice*.

The skin and the conjunctivae of the eyes discolor equally and at the same time or at least within a very short period beginning with the head and neck. Psychologically, too, the *icterus* almost always ac-

companies mental depression moroseness in adults an extreme fidgetiness in children The patients suffer from headaches dizziness and psychic weakness Severe mental disturbances maniacal delirium apathy and coma have been observed in *icterus gravis* The skin is implicated by a tormenting pruritus and urticarial eruptions have been observed Yellowish spots or plaques are noticeable on the eyelids as well as in other places e g the mucous membrane of the mouth



Fig 7b—*Leontasios Ossum* Same patient as shown in 7a showing an form enlargement of head five years later

Emotional *icterus* sometimes appears extremely suddenly in connection with mental conditions The case of a boy which Sidney Ringer reports is interesting when he went out into the cold the *icterus* appeared quickly but he turned pale as soon as he returned to a warm room *Weil's disease* (*acute febrile icterus infectious jaundice*) represents an acute infectious disease which occurs with *icterus* nephritis and tumor of the spleen It usually affects strong young men As a rule it sets out with dizziness chill thirst and vomiting extreme weakness and high fever It can be sporadic or appear in minor epidemics

A rare disease with yellow discoloring of the skin is the *chronic acholuric icterus* with splenomegaly

Circulatory disturbances of the liver can have manifold causes. Infections influences also climatic and dietetic conditions seem to be of importance. That Europeans living in the tropics are frequently seized by active hepatic hyperemia (hepatic congestion) should be proof of a combination of the above mentioned causes. General diseases are reflected in the color of the face. To illustrate *Malaria* takes a special place in the etiology of infectious diseases. Hepatic congestion often only the first sign of a later developing hepatic abscess, hepatic cirrhosis or neoplasm of the liver is also observed in connection with other infectious diseases such as *yellow fever* and *typhoid*. Among the symptoms we find slight icteric discoloring of the skin, mental feeling of dislike, depressed or irritated disposition. It is significant for the intimate connection between physical state and mental disposition that the purely physical expression of a surplus of bile (biliousness due to excess of bile, bilious ill humored) is significant of the mental condition.

Hepatitis (Hepatitis simplex) shows suddenly appearing chills, difficulty of breathing, high fever. The *hepatic abscess*, *hepatitis suppurativa* shows only rarely pronounced icteric skin discoloration, however it is almost always accompanied by a pale greenish discoloring of the face. The expression of the face is suffering, eyes and cheeks are fallen in. These symptoms made it possible for McLean to describe "the gloss of the mother of pearl of the conjunctiva" and to speak of a typical "hepatic abscess face". Spasmodic cough is a frequent symptom.

The atrophy of the hepatic cells in *hepatic atrophy* finally causes a shrinkage of the entire organ. This occurs in general nutritive disturbances in various cachectic conditions, above all in carcinoma of the digestive tract, in senile marasmus and others. It sets in with apparently harmless symptoms like slight jaundice. Later, eructation and vomiting follow, the patient feels dazed, shows delirious conditions with hallucinations which remind one of an acute insanity. The jaundice increases and coma followed by death occurs with muscular tremor and convulsions. The high fever usually occurs suddenly and toward the end. The jaundice finally appears as pronounced as *icterus melas*.

Various causes are presumed for the *chronic interstitial hepatitis (cirrhosis)* with more or less justification. Frequently abuse of alcohol is made responsible for *atrophic (granular) hepatic cirrhosis (Laennec's disease, alcoholic cirrhosis, hobnailed liver)* (Fig. 19). Poisoning, infectious diseases and other causes are listed. It attacks above all persons between the fourth and sixth decades, however, small children and old



Fig 8—Icterus gravis



Fig. 9—Severe jaundice in an alcoholic. Cirrhosis of the liver and degenerative heart disease thus a combination of cyanosis and jaundice

men may also be stricken. It appears in form of loss of appetite, eructation, loss of strength. Frequently even in early stages a pale yellow facial color and a septic color of the sclera can be noticed. Some patients complain of a feeling of deafness. Fever and opacity of the conjunctivæ are frequent. With progressing illness the general condition of strength and nutrition decreases. In the later stages of cirrhosis the sallow dull dis-



Fig. 10—Faces in Banti's disease (Courtesy of Dr. Lester Hollander)

fusely pigmented facies is often very characteristic. The hepatic facies of portal cirrhosis of the liver is a pale face with a peculiar pinched expression, sometimes slightly jaundiced. In grotesque contrast to the greatly arched tense abdomen is the extremely atrophic face as well as the entire emaciated upper part of the trunk.

The *hypertrophic hepatic cirrhosis* (connective tissue hypertrophy of the liver, Hanot's disease, *hypertrophic cirrhosis of the liver*) frequently follows a more or less long previous period of general ill feel-

ing and eventual slight icterus. Finally an agonizing itching of the skin appears, the patients scratch themselves but the icterus remains. The dry skin sometimes shows a lenticular eruption, especially on the forehead, chin and hands. The patients become emaciated and frequently have attacks of fever, however, there also are cases without fever. Convulsions, hallucinations and delirious conditions appear with increasing icterus. Somnolence is frequent, finally coma, cardiac weakness, and death result.

The etiology of *Banti's disease* (enlargement of the spleen with progressive anemia, followed by hepatic cirrhosis) is obscure. It was described at first, by Banti in Florence in 1891, as splenomegaly with cirrhosis. It is accompanied in various degrees by anemia, though cases without anemia also occur exceptionally. Usually, the pale anemic appearing color of the skin is characteristic, as well as the anemic appearance of the visible mucous membranes. A pale yellow tone color of the skin is also characteristic. It can deepen sometimes to marked icterus. The sclerae are not affected. The mucous membranes, especially of the nose and gums bleed slightly, and the physical strength gradually decreases (Fig. 10).

The facies in *pernicious anemia* may be absolutely characteristic in the later stages. The color is remarkable, often a pale primrose yellow, with a peculiar delicacy in the yellowish tint that is unmistakable when fully developed (Fig. 11). Soreness of the tongue (beefy tongue) is another characteristic sign of the disease (See Chap. 13, Fig. 19).

When a case of generalized lymphatic glandular enlargement presents itself, a blood count should always be made. Blood changes will indicate lymphatic leukemia, or if the characteristic leukocyte count is not observed, lymphatic leukemia will be excluded (Figs. 12 and 13).

Hodgkin's disease nearly always starts with much swelling of one group of lymph nodes before the rest, especially those in the neck. There is usually moderate enlargement of the spleen. The blood in Hodgkin's disease is for the most part normal (Figs. 14 and 15).

The coloration is the chief feature of the facies of *splenomegalic polycythemia*, presenting a characteristic appearance, a combination of weather beatenness, plethora, cyanosis. In most cases, the spleen, though definitely enlarged, hard, and firm, comes only a few finger breadths below the ribs. The first symptoms are vague, with progressive loss of working power and some shortness of breath on exertion. Hemorrhages may occur especially bleeding from the mouth, epistaxis, hemoptysis, hematemesis, hematuria or melena (Fig. 16).



Fig. 11—Pernicious anemia. Thick anemic lips. Puffy eyelids. Lemon yellow pallor.



Fig. 12—Chronic myelogenous leukemia. (Courtesy of Dr. Lester Hollander)



Fig. 13—Lymphatic leukemia



Fig 14—Hodgkin's disease (Courtesy of Dr Lester Hollander)



Fig. 15—Hodgkin's disease (Courtesy of Dr. Lester Hollander)



Fig. 16—Extreme cyanosis due to polycythemia vera. Obese appearance. Discoloration of all mucous membranes into bluish tinge.

Generalized darkening of the skin of the face in addition to anemia suggests *Addison's disease* but the distinctive character of the pigmentation is that it occurs in the mucous membranes within the mouth as well as on the face. Confirmation of the diagnosis may be established by finding a slight degree of eosinophilia a remarkably low blood pressure attacks of vomiting syncope and pronounced asthenia however buccal pigmentation while highly suggestive of Addison's disease is not pathognomonic as it has been noted in other conditions also. It is an almost constant feature in persons who have Negro blood in their ancestry even though this be from one great-grandparent only.

Frequently hepatic cirrhosis occurs with gouty arthritis. It was also described in diabetes for the first time in 1882 by Hanot and Chauffard (*cirrhose pigmentaire dans la diabeté sucré diabeté bronze avec cirrhose hypertrophique pigmentaire*). The striking cutaneous discoloration of this bronze diabetes is the change which sometimes is bluish gray and sometimes smoke brown. In contrast to Addison's disease the mucous membranes show no pigmented spots. The face most of the time is affected most strongly by the discoloration as well as the extremities and genitals. In contrast to jaundice the sclerae remain unaffected. Severe alcoholic excesses usually precede the disease which mostly afflicts males. The melanoderma gradually increases and the cachexia as a rule stands out prominently.

Partial hepatic atrophy can occur through necrosis of larger cellular complexes followed by the typical symptoms of icterus gravis and death as in phosphorus poisoning of the liver (phosphorus liver).

The congenital as well as the acquired form of hepatic syphilis (*syphilis hepatica hereditaria*) can appear in the newborn such infants have an emaciated faded appearance mostly accompanied by icterus. Their weakened condition increases more and more in many cases they show swelling of the lymph nodes as well as cutaneous affections above all the maculopapulo-squamous rose and copper red spots as well as the syphilitic rhagades which appear especially around the mouth. Also colds with peculiarly dry swelling of the mucous membrane of the nose are frequent.

The acquired form of hepatic syphilis mostly appertains to the tertiary stage of syphilis however already in the second stage hepatic disturbances with jaundice may be observed. It is significant that in adults hepatic syphilis takes its course without special symptoms and if it is detected during life the discovery is generally accidental. In advanced cases however we frequently find among other symptoms jaundice as

a result of pressure from the enlarged lymph gland on the portal vein as well as intermittent fever

Enlargement of the bile ducts originates more or less in their dilated occlusion. Inflammatory processes neoplasms in the lumen of the bile ducts or external causes as impaction of foreign bodies or external pressure are responsible

As a consequence of biliary engorgement jaundice appears. If however only a small branch of the hepatic duct is blocked only a slight icterus occurs or jaundice may be absent

Icterus simplex (catarrhal jaundice) represents a quickly passing *cholangitis* which extends upwards from the larger into the smaller bile ducts. Frequently it occurs following a preceding *gastroenteritis*. If an acute *gastroenteritis* spreads to the bile ducts the following symptoms may be observed. Loss of appetite eructation vomiting and sometimes light fever. Furthermore jaundice occurs with greatly differentiating pigmentation which varies from light yellow to dark bronze color and develops gradually. The conjunctiva reaches its highest degree of discoloration between the third and fifth day the skin assumes a change in color around the sixth day. The cutaneous itching characteristic of icterus appears with the usual scratching effects. The intensity of the itching does not run parallel with the degree of the discoloration of the skin. The pruriginous irritation may occur very violently in some patients with equally strong skin discoloration in others the pruriginous irritation is absent entirely. Frequently there are fever and chills. Persons under equal living conditions as soldiers inmates of institutions sometimes are victims of icterus however since there is no proof of any transmissible infection one can only speak of a kind of epidemic which could be explained by the same climatic dietetic and other equal factors

In the course of pregnancy jaundice may be observed recurring in the fourth and sixth month of gravidity. It is accompanied by nervous irritations such as restlessness and excitability and it may be initiated by vomiting and other causes. Icterus also occurs shortly before menstruation and is explained by swelling of the liver and the bile-ducts

The malignant neoplasms of the liver (*carcinoma sarcoma adenoma hepatitis*) as a rule are projected metastatically into the liver or encroach on the liver from its vicinity

Hepatic carcinoma has already been observed in a six months old child or in the first decade of life. It is however found mainly between the ages of 45 and 65. Women are more frequently attacked by it in the form of secondary hepatic cancer this may be connected with the frequently occurring carcinomas of the breast the ovaries and the uterus

Heredity seems to have an influence on hepatic cancer. Also the climate seems to play an important rôle. While we frequently find hepatic disease in a warm climate cancer of the liver is rare. It seems to be almost unknown in Egypt and India.

Cancer of the liver shows itself at first in an exhausted feeling of weakness, loss of appetite, irritability. The skin appears dry, withered and exfoliated. The skin of the face assumes a greenish-pale color, the scleræ are discolored light yellow, sometimes pronounced jaundice occurs also. The loss of weight increases and the patient finally offers the characteristic aspect of cancerous cachexia. The temperature rises with the advance of the disease and is sometimes accompanied by chills. In cancer of the pancreas jaundice may be present.

Echinococic cyst is to be mentioned as the most frequent of all parasitic infections of the liver. It develops from the embryos of the *canis* species which are found in *tænia echinococcus*. If they gain access into the gastrointestinal tract with the mother parasite the embryos are finally set free and develop in the cysts. *Echinococic* cysts may produce no symptoms as long as they do not cause clinical manifestations by reason of their position and size. With the growth of the cysts a dry cough, vomiting, emaciation and decline of strength result.

The interference with the function of the kidneys are many, they are far reaching and independent of each other. Depending on the manifold interferences of the varied functions of the kidneys different forms of uremia may become manifest: nervous, cerebral, psychotic (mania), visceral, gastrointestinal, eclamptic, epileptic, paralytic, convulsive, asthenic, dyspneic (asthmatic) and latent uremia.

Pre-uremic and uremic manifestations are observed in sclerosis of the arteries and kidneys (psychotic uremia) in general arteriosclerosis. Above all if the sclerosis is localized in the brain and kidneys these conditions prevail. Premontory symptoms are forgetfulness and marked excitability. Furthermore headaches appear frequently accompanied by dizziness and spots before the eyes. Sometimes the condition culminates into eclamptic attacks. Psychotic conditions reach various degrees including irritability, confusion, hallucinations, emotional upsets and mental outbursts. The mental manifestations are frequently accompanied by respiratory disturbances. Cheyne-Stokes respiration may appear suddenly and disappear just as quickly.

Acute glomerulonephritis usually starts suddenly and affects both kidneys. Scarlet fever is first to be mentioned among the etiologic factors here. For the most part the inflammation of the kidneys appears toward the end of the third week. Edema is a characteristic symptom.

Facial edema with swelling of the eyelids makes it difficult for the patient to open his eyes after sleeping. Only in relatively few cases of acute diffuse nephritis is edema absent; however, greatly differing degrees of



Fig. 17—Acute nephritis with massive edema. Patient 14 years of age

swelling may be observed. Some patients appear only slightly sodden faced; in other cases the tissues are swollen to the utmost. Edema may remain for several months, although it sometimes disappears after a few days (Figs 17, 18, 19 and 20).

In *chronic diffuse glomerulonephritis*, edema also occurs. Lasting cardiac weakness develops if the disease eventuates in the stage of *secondary contracted kidneys*. The heart is markedly hypertrophied and weak.

ened by reason of the long lasting hypertension. Usually a far advanced arteriosclerosis of the renal vessels is found. Both heart and kidneys eventually fail in their functions, both cooperate to hasten the general decline. Under these circumstances the skin appears pale yellow and dry. The face is swollen. General emaciation goes hand in hand and parallel with the deterioration of fat blood and muscular apparatus. Frequently these are accompanied by visual disturbances such as *retinitis nephritica* (retinal bleedings).



Fig. 18a—Edema of the face in acute nephritis

Asthenic uremia usually develops gradually and represents *chronic uremia*. This renal marasmus develops in chronic nephritis and in renal sclerosis (primary or secondary contracted kidneys). Frerichs describes this condition as follows: "The chronic form of uremia gradually creeps over its victim unnoticed and almost always kills him. A certain mental indolence and somnolence often can be observed in the face in the early stages of *Morbus brightii* and in the mannerism of the patients. The patients complain of dull headaches or a confused feeling in their heads. Their eyes become dim and expressionless, their physiognomic features drawn, they

live unconcerned and by themselves, are forgetful and indifferent, slow and indolent in their movements. Somnolence gradually turns into stupor, followed by increased lethargy; the respirations become stertorous and at the end finally turn into a death rattle. The patients sometimes become delirious. Convulsions often precede death. Tremor of the hands, twitching of the facial muscles and finally clonic spasms spread over the entire voluntary system."



Fig. 18b—Facial edema (acute nephritis).

Frequently, the patients suffer from neuralgic pains, the same as in uremic pruritis. The loud respirations can finally be heard at a distance; they are accelerated and deep. Often if the patient is still conscious, *Cheyne-Stokes respiration*, denoting the decrease of excitability of the respiratory center, is present.

The form of intoxication in acute nephritis is the so-called *spasmodic uremia*. It is also called *acute uremia*, because it usually appears suddenly and has a brief and an intermittent course. It customarily appears



Fig. 19—Acute nephritis. Edema of the eyelids

in the beginning of an acute nephritis also in the neuropathies of pregnancy. It is rare in *contracted kidneys* as well as in *non nephritic anuria*. It frequently starts with severe headaches and a stiff neck. The face is swollen. The patient often has a high temperature as well as a certain numbness. An epileptic attack may occur suddenly.

Sometimes the attack is preceded by a period of general restlessness. Frequently the attack is introduced by lightning-like twitches of the facial nerve which spreads to the extremities. When consciousness is lost tetanic manifestations appear finally resulting in light *opisthotonos* and respiratory standstill. The pale swollen face is discolored blue-red in a suffocative attack. The veins of the neck become markedly prominent. The face and the bulb are directed upward and the white scleræ which are visible through the partially opened eyelids form a terrifying aspect. Finally the cyanosis decreases under muscular twitchings or spasms while the restless spasmodic muscular contractions increase. After comparatively short duration—about two minutes—complete exhaustion appears and the patient sinks into an unconscious snoring sleep accompanied by foaming at the mouth. At his awakening the memory of the terrifying attack seems to be entirely lacking. The patients then usually complain only of severe headaches. Some patients may awaken completely blinded from these attacks. This *uremic amaurosis* is only a partial effect of a cerebral affection. The general affliction of the brain seems to explain the indifference of the patient to his sudden blindness in contrast to the patients who lose their eyesight because of retinitis and papillitis in connection with acute nephritis.

Frequently the attack is followed by mental disturbances and severe muscular conditions.

Most of the patients afflicted with severe hydrops in connection with acute nephritis do not suffer from spasmodic uremia.

High grade edema is also a symptom in disease of the epithelial structures of the kidneys (*epithelial nephropathy*) which occurs in the secondary stage of syphilis and is that form of epithelial renal disease which is especially amenable to treatment because here as well as in the kidneys during pregnancy there is an excellent prospect for complete recovery. It becomes manifest in treated as well as untreated syphilitic patients. The swollen pale face in a short time shows pronounced hydrops. If the serous cavities also are affected by the effusion dyspnea results. Headaches are also frequent symptoms.

Amylod kidneys are observed in syphilis chronic suppuration and in tuberculosis especially if cachexia is present. Here also pronounced edema belongs to the characteristic symptoms.

Otherwise strong and healthy women are frequently afflicted with *nephropathia gravidarum*. In the second half of pregnancy it starts with mild forms of edema which may increase excessively later on. Eight per cent of women affected with this condition are said by Zangmeister to develop eclampsia. The condition disappears, as a rule, after delivery.



Fig. 20—Bags under eyes in acute nephritis.

Nephritic edema (hydropsia renalis) is distinguishable from cardiac hydrops. While in the latter instance the skin appears cyanotic or red in color, frequently with a brownish tone-color resulting from a long-lasting stasis, renal hydrops is characterized by a transparent pallor of the skin; it starts in the face first, appearing in the loose connective tis-

sue of the eyelids. The swelling of the eyelids renders the opening of the patient's eyes difficult in the morning when he awakens because the swelling is most marked at that time. On the other hand the swelling is more pronounced in the evening in cardiac hydrops which begins in the lower extremities.



Fig. 21—Food allergy

In *acute indigestion* a feeling of nausea and belching of gas occurs. Cold perspiration, headache, salivation, a feeling of general lassitude and depression is observed. Fever up to 39°C (102°F) in adults, usually higher in children, may occur. Before vomiting occurs the nausea and pain may increase in severity. Children may show apathy, contracted pupils, restlessness, stupor or convulsions.

Chronic functional gastric disturbances are frequently accompanied by loud malodorous belching and may last for several hours. Nausea is frequent. Quite often the patients complain of vertigo in connection with indigestion.



FIG. 22—Peptic ulcer for one year. Typical lean, narrow face with alert appearance—most expressed in the eyes.

Soreness of the mucous membrane of the mouth or tongue is manifest in various forms of *stomatitis*, and is common in digestive disorders (See Chapter VII Figs. 3, 4 and 5.)

Attacks of indigestion are frequently associated with pruritis especially when the patients are neurotic. Sometimes in *angioneurotic edema* or chronic *urticaria* is observed. Food allergy may also cause edema (Fig. 21).



Fig 23—Cachexia due to a long present malignant tumor of the colon. Alert unrelaxed facies of the wasting due to true emaciation without inflammation.

As a postprandial symptom a *reddening of the nose* and flushing of the face is noticed quite often

Ulcer of the stomach is accompanied in addition to stomach pain after meals by occasional vomiting and sour eructations. At times the



Fig. 24—Cachexia due to a chronic long continued septic process (infected moist gangrene of the leg). Wasting of panniculus adiposus outlining all bony prominences including skull with puffiness of tissue due to toxin. Alert however showing flaccidity of the muscles of face in contrast to the cachexia of cancer.

pain may increase in severity and vomiting becomes more frequent. The patient typically has a lean narrow face with alert appearance mostly expressed in the eyes (Fig. 22) sharpened nose angular jaw absence of spare fat and deep lines extending from the alae nasi to the angles of the

mouth. According to Davies and Wilson. There is a rather aggressive alertness and readiness to tackle any job or problem. Their alert watchful expression conveys a suggestion of continual apprehension mixed with defiance. A serene contented facies is never seen, say Draper and Touraine.

Acanthosis nigricans with its extreme pigmentation which develops in various parts of the body but particularly on the face and neck is associated with cancer of abdominal organs especially carcinoma of the stomach. The pigmentation may be the predominant condition without any suggestion at the time that there is a carcinoma anywhere.

Malignant tumors of the stomach (carcinoma) always interfere with the nutrition of the body and emaciation may be pronouncedly manifest in the face as elsewhere in the body. It is commoner in men than in women. It rarely occurs before the age of 35. In advanced cases the patients have generally lost their strength and appear as in the latter stages of other malignant tumors pallid, faded and emaciated.

The colon is occasionally the seat of cancerous growth when the patient complains of chronic intestinal obstruction accompanied by cachexia, tenesmus and passage of blood stained stools. These patients show an alert, unrelaxed facies of wasting (Fig 23). Cachexia due to a long standing septic process differs from the cachexia of cancer in the flaccidity of the facial muscles (as seen in Fig 24).

The *mydriatic test* in acute abdominal cases is highly suggestive of *acute pancreatitis* and usually gives a positive reaction namely dilatation of the pupil (Loewe's test).

The anxious, distressed facies of acute generalized *peritonitis* leaves no doubt as to the severity of the symptoms. The teeth are uncovered by raising of the upper lip and the whole expression is significant of pain and mental disquietude. The respiration is somewhat quickened because of the fixation of the abdominal muscles. In an acutely developed attack, particularly if the vomiting has been severe and continuous, the Hippocratic facies (Chap I Fig 1), pale gray lipped, sharp nose hollow eyes is seen more frequently perhaps than in any other disease except *cholera*. Localized slight peritonitis shows no characteristic physiognomy although a faintly anxious expression is present and significant.

Continuous fever with sweats and chills and marked anemia are symptoms usually associated with *infected fibroids of the uterus*. The *ovarian facies*, with its drawn, pinched expression occurs in women suffering from large ovarian tumors. The face has a flushed and parched appearance.



Fig. 25—Facies in terminal tuberculosis



Fig 26—Typhoid facies

Hysterical dysphagia (*Plummer Vinson syndrome*) is characterized by difficulty in swallowing solid food without the existence of an obstructive lesion in the esophagus. It is associated with glossitis, anemia, and splenomegaly. Mild dysphagia over a long period of time without



Fig. 27—Chronic emaciating disease. Lung abscess for 1½ months secondary to ether anesthesia. Pale secondary anemia coloring with haggard facies. Foul sputum causing probably the apparent self-condemning disgust.

progression of symptoms suggests the presence of a benign tumor. Here an anxious facies is encountered.

Traumatic asphyxia occasionally complicates compression injuries of the thorax. The face is purple. Cyanosis is confined mainly to the face and neck. The conjunctivae are bright red.

Diabetes mellitus is liable to cause the most characteristic *brady/pnea* (the air hunger of diabetic coma) This results from extremely deep slow breathing

In an ordinary frank pneumonia the face as a whole is flushed with a deeper tint of red upon one cheek the alae nasi move rapidly in and



Fig. 28—Subacute debilitating disease with typical elements of toxicity and anemia. A case of subacute bacterial endocarditis with emboli. Pallor (lack of pigmentation) relaxed lower face mouth chin and cheeks and trace of strained expression left only in the eyes.

mony with the rapid respirations. The eyes are bright and *herpes labialis* may be present. As the disease approaches the septicemic type a general pallor brings the malar flush into stronger relief but in the markedly typhoid variety of the disease the flush may entirely disappear.

In advanced phthisis the countenance is very expressive. The wide open appealing eye the emaciated face the pallor of which is in strong contrast to the blotches of red over the malar bones the dilating alae

and panting respiration, constitute a significant and graphic portrait (Fig 25)

The patient with *typhoid fever* has bright eyes and flushed cheeks at first but with progression of the disease the expression becomes dull and apathetic. The mentality is impaired and the patient is quite indif



Fig. 29—Carotid-cavernous arteriovenous aneurysm

ferent to his surroundings. The tongue is apt to be dry and the teeth covered with brownish sordes (Fig 26)

The *facies of chronic emaciating diseases* with typical elements of toxicity and anemia are pale with a hue betraying secondary anemia, relaxed mouth, chin and cheeks and a trace of strained expression manifest in the eyes.

In pulmonary conditions with *foul sputum* the self-condemning disgust is apparent (Fig 27)

Unilateral exophthalmos may be due to *arteriovenous aneurysm*. Fig. 29 shows a man who following an automobile accident eight years previously had a pulsating exophthalmos. The left common carotid artery was ligated seven years before. Ligation was followed by a spastic right hemiplegia and aphasia. The autopsy of the patient shown in



Fig. 30—Autopsy of patient shown in Fig. 29

Fig. 29 reveals marked atrophy of the left cerebral hemisphere; the cortical vessels of which were greatly engorged. The hollowed-out cavernous sinus and frontal hyperostosis are apparent (Fig. 30).

Figure 31 shows an individual with an unusually large *aneurysm*.

Mitral stenosis is of all the valvular lesions of the heart the most apt to lead to increased heart action, although the increase seldom occurs until there is other evidence of cardiac decompensation. The flushed cheeks, the cyanosis of the lips, and the pinched cyanotic alae nasi seen in mitral stenosis form so characteristic a picture that its presence may be suspected from the facies alone (Figs. 32 and 33).



Fig. 31.—Facies of individual with tremendous aneurysm.



Fig. 32—Rheumatic heart disease with mitral stenosis of 25 years' duration. Patient 57 years of age. Characteristic flush of cheeks and nose. Absence of worried or strained appearance of degenerative cardiac disease. No bagging under the eyes.



Fig. 33—Facies in advanced case of mitral stenosis



Fig. 34—Hypertensive heart disease. Severe anemia shown by striking pallor of the face. Expression of tension and apprehension.



Fig. 35—Degenerative heart disease. Noteworthy because of the shifting cardiac rhythm. The patient has the anxious worried, apprehensive expression of the heart-conscious patient. Beginning nephritic condition of the degenerative heart is shown beneath the eyes.



Fig. 36—Subacute bacterial endocarditis with cerebral embolus involving face



Fig 37—Arteriosclerotic heart disease Cyanosis of lips and ears Cold clammy skin
Facies of exhaustion

Patients with *hypertensive heart disease* show a facies betraying premature senility, anemia, cyanosis of the lips and an expression of tension and apprehension (Fig 34)

Degenerative heart disease may cause a shifting cardiac rhythm. These patients have the anxious, worried, apprehensive expression of the *heart-conscious* patients (Fig 35). In well-compensated cases of silent coronary disease there is no definite anxious look. Figure 36 is that of a



Fig 38—Coma, skull fracture. Automobile accident. Fracture of base and vault of cranium. Note blood on teeth. Blood also in spinal fluid.

patient with subacute bacterial endocarditis and a cerebral embolus involving the facial nerve on the left side of central type. Secondary anemia is also in evidence.

Coma is a state of unnatural heavy, prolonged sleep, often accompanied by slow breathing, frequently ending in death. It may be due to various causes which may be classified into two main groups, namely those in which coma is a terminal phenomenon and those in which coma comes on early and is the most prominent feature of a particular case. The first group includes certain severe fevers, acute inflammatory lesions

of the brain, or the cerebral meninges, certain less acute lesions of the central nervous system, diseases in which general metabolism is probably at fault and late stages of certain other maladies that exhibit prominent symptoms other than coma before the latter intervenes.

Coma is often the result of *head injury* (Figs. 38 and 39), *vascular lesions of the brain*, the *acute effects of drugs* (Fig. 40), the *chronic*



Fig. 39—Coma Fracture of the skull.

effects of chemicals, the *effects of extremes of temperatures*, *excessive loss of blood*, *Stokes-Adam disease*, *sudden nervous shock* and *hysterical trance*.

Senility is the sum of the physical and mental changes occurring in advanced life. The more usual symptoms of senile involution are, in the main, loss of memory for recent events, lack of ability to recognize faces and often marked egotism. *Senile wrinkles* are one of the physiologic concomitants of the aging process and are due to the loss of skin

elasticity. Other visible signs are gray hair, the raucous voice, the *arcus senilis*, senile cutaneous affections, and signs of arteriosclerosis in the superficial arteries (Fig. 41).



Fig. 40—Insulin coma

The *facies of impending death* show a sharp nose, hollow eyes, collapsed temples, the ears are cold, contracted, and their lobes turned out; the skin about the forehead is rough, distended, and parched; the color of the whole face is brown, black, livid, or lead-colored. As a rule, such a countenance is a sure precursor of death, except in acute diffuse peritonitis, cholera, or starvation (Figs. 42 and 43).

The expression of the face in *natural death* is always blank, and the features settle into the habitual positions of relaxation. Figs. 42 to 48 demonstrate preterminal and terminal *facies*.



Fig. 41—Senile faces



Fig. 42—Moribund cachectic patient (Carcinoma.)



Fig. 43—Premortem facies. Unconscious. Note flies on trusted eyelids.



Fig 44—Premortem facies. Moribund 63 year-old patient suffering from abdominal cancer. Note semiclosed eyelids.



Fig. 45—Postmortem facies. Same as Fig. 44. Note opening of eyes and change of expression.



Fig. 46—Tints



Fig 47—Benign smile of death. (Postmortem)



Fig 48—Postmortem faces

Figures 49 and 50 are facies of *acrosclerosis*. Figure 49 is that of a patient who had a typical syndrome of acrosclerosis as described by Seller with a tremendous loss in weight and unbelievable amount of tissue shrinkage. The process was progressive. Figure 50 represents the end



Fig. 49—Acrosclerosis (Courtesy of Dr. Lester Hollander)

result of such a process quiescent at least it was stationary for a good period of time. The expressionless set face is an interesting part of the picture (Hollander).

Observation of the contour of the face and facial expression should be cultivated so that such a study will result in almost a subconscious recognition of pathologic conditions. Often a suspected facies will point



Fig 30—Facies of acrosclerosis

the way to further diagnostic exploration and point a path for proper recognition and evaluation of a given pathologic entity

(For other visual manifestations of pathologic conditions of special organs such as the eye, ear, nose and skin see their respective chapters)

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CHAPTER XVII

ENDOCRINOLOGY AND THE FACE

THE human mind and face reflect the effects of the intimate cooperation between the endocrine system and other organs of the body. The ductless glands exert a regulatory influence on metabolism profoundly affecting the liver, gallbladder, lungs, kidneys, and gastrointestinal tract; the osseous system, the skin and its appendages, the circulatory organs, the muscular and nervous systems, including the sensory organs, and the genitalia.

In view of the multiplicity of these interrelationships, it has not been definitely proved what mechanism is responsible for the effects on the mind. Disturbances of metabolic equilibrium in the ganglion cells of the brain may be the cause. The problems involved are still hypothetical, and many factors are obscure. It seems clear, however, that in some way the intricate correlation of the endocrine and nervous systems gives rise to the mental and facial changes noted.

Coincident with the development of toxic diffuse (exophthalmic) goiter is noted change in character: takes place nervousness, irritability, etc., are almost always complained of. In exact contrast is the apathy and lack of interest in cases of *myxedema*. The mood of depression in *tetany* is well known. A strikingly quiet state of mind is observed in *cerebral adiposogenital dystrophy*, while in Addison's disease the feeling of mental debility predominates. The changes brought about by puberty, retarded development of the sex glands or castration are well known. manifold symptoms ensue presenting numerous diagnostic difficulties.

The ductless glands have a decided influence on the development of the osseous system. *Dwarfism* as well as retardation of growth is caused by lack or distinct reduction of the function of the thyroid gland, particularly if such hypofunction occurs in adolescence. Here the dimensions of the skeleton remain infantile while the bones grow large. A characteristic sign, among others, is the drawn-in root of the nose. Excessive growth of bone lengthwise, however, with the head remaining small, is caused by marked *hypoplasia* or *loss of gonads in adolescence*. Lack of *adenohypophyseal function in early years* is the reason for pronounced dwarfism. *Precocious development* of the entire body, on the other hand, is caused by hyperfunction of the gonads (stimulated by the *pineal body*) at an early age. The manifold influences of other ductless glands on growth and bone formation are not as yet thoroughly explained. Endocrine activity has a decided influence on the development of teeth.

Thus for instance in adult myxedema the teeth show severe trophic changes. The decay of dental crowns is characteristic. *Infantile myxedema* (juvenile thyroplasia) leads to abnormally prolonged preservation of the temporary teeth. Every attack of *tetany* occurring during childhood leaves lasting defects in the enameled surface of the growing permanent teeth.

Precocious general development occasioned by tumors of the gonads, epiphysis, or suprarenal glands is accompanied by premature and accelerated development of the teeth; this is retarded by function of the thyroid gland or the adenohypophysis.

Dysfunction of the thyroid gland is also responsible for several changes in skin and its appendages. *Exophthalmic goiter* produces a tender skin which is abnormally moist due to the increased sweat secretion. In contrast thereto the skin is dry in myxedema because the secretion of the sweat glands is disturbed. The hair turns dry and brittle; hair growth is diminished and falling out of the hair may lead to completely bald spots on the head.

Typical skin changes particularly in the male are caused through dysfunction of the generative glands; thus the skin in eunuchs or in *early senility* turns flabby and shows premature wrinkling. These changes also occur in dwarfism and above all in *hypophyseal cachexia*. They result in the latter disease not only because of the feeding function of the gonads but as symptoms of the involvement of the skin in the general scheme of organic atrophy. Hyperplasia of the soft tissues of the extremities in *acromegaly* also involves the skin. There exists a close connection between the pigmentation of the skin and the endocrine function. Abnormal pigmentation in Addison's disease is particularly prominent on the exposed parts and folds of the skin; on the mucous membranes of the mouth and other areas pigmentation appears in unusual localities in the form of bluish black spots. In *exophthalmic goiter* it usually appears symmetrically.

In endocrine diseases numerous changes take place in the sensory organs which influence more or less the expression of the face. The ocular symptoms in diabetes for instance display an inclination to conjunctivitis, iritis, changes in refraction, hypotonia of the bulbs, and premature cataract. Cataract is also observed in tetany. *Senile cataract* may develop in connection with gonadal dysfunction. There is also a connection between thyroid gland dysfunction and intraocular pressure. Other ocular changes which should be cited are *exophthalmos* in toxic diffuse (exophthalmic) goiter, changes of the pupil in tetany and increased sensitivity of the *dilator pupillae* to epinephrine in diabetes. Because of



Fig. 1—Front view of early exophthalmic goiter. Smooth moist skin. Fine hair. Slender build physically. Tendency to fair skin. Staring fixed expression of the eyes.



Fig. 2—Lateral view of early exophthalmic goiter. Showing increased palpebral tissues.

severe swelling of the mucous membrane of the auditory canal intense auditory disturbances occur in myxedema *Aplasia of the thyroid gland* causes significant changes in the development of the auditory canal

Most symptoms characterizing exophthalmic goiter signify a hyperfunction of the thyroid gland (*hyperthyroidism*) (Figs 1 and 2) This disease is among other symptoms accompanied by loss of weight tremor change of the skin a generally pulsating goiter loss of hair and exophthalmos The ratio of females to males with this disease is about six to one The onset occurs in the greatest number of cases between the second and fourth decade Children or persons over 60 years are seldom affected A constitutional disposition seems to play an important part as the frequent report of *Basedow families* proves Psychic disturbances worries excitements shocks and sexual abstinence are reported as contributing factors as are infectious diseases such as syphilis malaria typhoid polyarthritis influenza and also local inflammatory processes

The most significant sign reflected in the face is *exophthalmos* (*proptosis*) mostly bilateral rarely asymmetrical It begins with a relatively slight increase of the luster of the eyes (Figs 3 and 4) In some cases alarming eye symptoms may develop in the course of a few days sometimes overnight often preventing complete closure of the eyes Retraction of the lids and consequent widening of the palpebral fissure (*Stellungs sign*) is always part of the picture The upper lid is unable to follow the descent of the eyeball sufficiently when the patient looks downward and there appears a band of white sclera between the cornea and eyelid (*von Graefe's sign*) An absence of wrinkling of the forehead when the head is bent down and the patient looks upward is frequently present in these cases (*Joffroy's sign*) (Fig 5) The power of convergence of the visual axes is impaired (*Moebius sign*) (Fig 6) Conjunctivitis is a frequent symptom Optic atrophy optic neuritis and ocular palsies are relatively rare

Vasomotor as well as trophic and secretory symptoms are frequent in exophthalmic goiter General or local *hyperhidrosis* may appear by day or night The moist and vascularized skin is thin and tender Abnormal skin pigmentations e g chloasma or vitiligo are frequently present There is almost always loss of hair especially from the scalp by the development of bald spots but there is seldom baldness An early greyness among other symptoms makes the patient appear to have aged before his time A transient edema especially of the eyelids is rather frequent

The ocular symptoms in exophthalmic goiter which as said may appear in varying intensity sometimes produce the facial expression observed in cases of extreme shock (*Moebius*) While some patients



Fig. 3—*Troph halmsc go ter*



Fig 4—Exophthalmic goiter in Negro

show either bulbar protrusion only or a gaping palpebral fissure advanced cases generally have both signs. Abnormal tonus of the sympathetic fibers innervating *Landstroem's musculus palpebralis* is believed to be here the most active cause. When the protrusion of the eye be-



Fig. 5.—Exophthalmic toxic thyroid in young person. Obvious lagophthalmos and exophthalmos. Midsuprasternal thyroid bulge. Typical smooth fine skin texture and thin white hair. Typical smooth tan like skin color.

comes very marked a luxation of the bulb may occur. In advanced cases of the disease a chronic protrusion of the bulb probably caused by an increased deposit of retrobulbar fat is often to be found. A retrobulbar accumulation of fluid caused by toxic vascular paralysis or venous obstruction often serves as an explanation for the development of the exophthalmos.

Unilateral exophthalmos, which is rare is accompanied by simultaneous as well as crossed unilateral swelling of the thyroid. An increased tonus of the *levator palpebrarum* leads to the already mentioned Graefe's sign.



Fig. 6—Exophthalmic toxic thyroid in young person

Many cases of exophthalmic goiter show increased dryness of the eyes but sometimes lacrimation is one of the symptoms. Severe injuries of the cornea frequently resulting in ulceration and detachment may be caused by extremely developed protrusion. As a result of the excessive protrusion necrosis of the vitreous body and falling out of the lens are sometimes observed. Death as a result of a developing *panophthalmitis*



Fig. 7—Colloid goiter.



Fig 8—Colloid goiter Prognathism



Fig 9—Carcinoma of the thyroid (Courtesy of Dr Lester Hollander)

has been observed. Cataract operations in cases of this disease have an unfavorable prognosis.

Substernal goiter may cause dilatation of the veins over the thoracic inlet due to pressure upon the internal jugular veins and this dilatation may be the key to diagnosis. Tilting the head strongly to one side produces dyspnea.

Colloid goiter may be very disfiguring and the patient may have no other complaint when presenting himself for examination (Figs 7 and 8). A hard stony irregular gland suggests carcinoma (Fig 9).

Complete extirpation of the thyroid gland as well as its hypofunction leads to myxedema which owes its name to the characteristic change of the skin. This swelling of the skin may affect the entire body but more often it affects the skin of the cheeks eyelids nose neck etc. All vital and vegetative processes appear altered the mental functions being retarded the metabolism and excitability of the whole vegetative nervous system are reduced. Other symptoms include trophic disturbances of the skin hair teeth etc. Almost all organs show changes among which a premature sclerosis of the vascular system is notable.

Adult myxedema is usually rare affecting women rather than men at a ratio of about 107:10 (Heinsheimer). Mothers are more susceptible than childless women. The disease usually develops at the menopause or following it in women and at about 45 years in men. There is a notable preponderance of multiparous women among persons thus affected suggesting endocrine dysfunction. Congenital disposition the so-called hypothyroid constitution seems to play an important role. Goiter or other disturbances due to thyroid insufficiency in cases of myxedema as well as a tendency to endogenous obesity are also frequently observed. *Inflammation of the thyroid* following infection or other illness may sometimes develop into abscess formation and myxedema this has been observed following influenza dysentery erysipelas etc. Bullet injuries of the neck followed by suppuration can also lead to myxedema.

Tuberculosis of the pituitary gland is relatively rare. More women than men suffer from this disease probably due to the fact that the normal sexual functions in the female exert greater demands on the thyroid function and thus may lead to an earlier exhaustion the result of injury of the parenchyma through repeated infection or intoxication.

The obvious changes of the skin a hard and almost incompressible edema of the face and other parts of the body are gradually developing leading to grotesque disfigurement of the face thick folds of the cheeks swollen eyelids double chin etc. The swelling of the eyelids results in a palpebral fissure mimicry becomes restricted and the facial expres-

sion displays a somnolent rigid character. The swelling also extends to the mucous membranes: the oral mucous membrane often becomes discolored while the swollen mucous membrane of the larynx brings about changes of the voice. The tone and timbre turn harsh, often making singing impossible. Nasal respiration is aggravated because of the swelling of the pharyngeal tonsils and the uvula which leads to mouth breathing and snoring in sleep.

When the swelling affects the eustachian tubes and the tympanic cavity the hearing may be disturbed. A characteristic symptom is the enlargement of the tongue which shows dental impressions and is visible between the teeth. Not only does the mucous membrane of the tongue swell but the lingual papillae also become hypertrophic.

The dry, harsh, myxedematous skin is easily chapped. It is pale-grey or golden yellow in color but is seldom pigmented. The cheeks turn yellowish assuming a bluish-red hue particularly in cases marked by *senectasie*. Often the lips and nose turn bluish-red for the same reason.

The hairs of the head, eyebrows, beard and other parts of the body fall out, sometimes leaving it completely hairless. While the remaining hair does not turn grey as it does in *exophthalmic goiter* it sometimes changes its color. The teeth often become carious and fall out. Sometimes the dental crowns become completely ground off.

Severe developmental disturbances are associated with the symptoms of myxedema when the hypofunction of the thyroid becomes manifest in the immature organism. These tardy developmental phenomena become more apparent the earlier the disturbances appear.

Congenital thyreoaplasia is a rare disease. Tuberculosis, syphilis, consanguinity of the parents or a neuropathic disposition may be contributory factors. The disease affects several members of the same family; its incidence is often sporadic. Female children are much more susceptible than are males. Production of sounds and speech is arrested. The typical characteristics of the myxedematous cretin appear. In the infant cretin the rings of the trachea can be felt so plainly that it is possible to be quite confident of an absence of the thyroid gland. Dwarfism is always part of the picture. Further symptoms include thickness and sponginess of the skin which is pale and dry; swelling of the lips and eyelids results in mongoloid slithlike eyes. The cheeks are flat and a double chin and swelling of the nape of the neck develop. The hair becomes discolored, coarse and frequently scanty. Anatomical studies disclose that in these cases there exists a complete absence of the thyroid gland, only microscopic remnants being demonstrable.



Fig. 10—Cretin.

Insufficiency of the thyroid gland causes such severe disturbances of growth that in marked cases the entire body length decreases to less than one meter. Pronounced deformity results from the disproportionately



Fig. 11a—Midget 21 years of age

large circumference of the head to the proportion of the rest of the body. The retarded growth of the sphenoid bone results in the characteristic drawing in of the root of the nose causing a typical expression of the face. The development of the teeth proceeds very slowly and never becomes complete. These children often remain without any teeth during the first year of life or they retain their milk teeth which developed beyond the normal period. At the same time rudimentary formations of the remaining teeth appear.

Respiration is often hindered to the utmost. Children thus afflicted are snoring and snorting and suffer from a constant nasal discharge. The protrusion of the enlarged tongue, the low hairline reaching far onto the forehead, the prominent zygomatic bones, puffed up lips and



Fig. 11b—M, age 21 years of age

the drawn-in root of the nose complete the peculiar expression of the face.

Secretory disturbances of the thyroid exert a marked influence upon the *endemic cretin* (insufficiency of the thyroid). When appearing at an early age it is responsible for the development of grave disturbances (Fig. 10). Hyperthyroidism also plays an important role. It is the most frequent of the infantile thyroid diseases and is as the name indicates essentially endemic in goiter districts. Disfigurement of face and body

as well as arrest of growth frequently appears as early as the first year unless it develops relatively late dwarfism results (Fig. 11)

The shape of the face is characteristic. The low platycephalic form of the skull with peculiar shortening of the base of the skull is caused



Fig. 11c—Midget 21 years of age

by a premature fusion of the three basal bones. The characteristic features are saddle nose, prominent mongoloid cheek bones, oblique slit eyes, an enlarged tongue and prominent lips, a low and broad underjaw, anomalous teeth and a short and swollen neck. In many cases the skull appears small; in other instances abnormally enlarged.

In most cases the eyes are widely separated. The expression of the face is morose. The skin frequently displays spectral flabbiness and many

transverse wrinkles on the forehead give the appearance of senility. Various kinds of myxedema are observed.

The frequently occurring conjunctivitis produces eczema of the edge of the eyelids. These conjunctival inflammations probably originate in the lachrymal secretion which is altered by the underlying pathology responsible for the saddle nose. The color of the skin indicates an extreme anemia. The hair is usually short and brittle.

Cretinism displays a special variety of individual symptoms. The dental anomalies for instance show an abnormal development of the maxilla and delayed dentition, frequent caries, defects in the structure and in the encaustum with erosions. The disturbances of the intellect in cretinism may vary from slight feeble-mindedness of various degrees to the absence of all mental impulses. Adult tetany is a disorder of the parathyroids having many different causes. It represents an abnormal state of excitability of the entire nervous system. The face frequently participates in the ensuing convulsions with spasms of the eyelids, muscular contractions, jaw clonus and slight pursing of the mouth (fish mouth attitude) and spasms of the genioglossal and hypoglossal muscles (yawning spasms). Tonic rigidity of the tongue causes speech to be restricted. Convergent strabismus occurs with diplopia.

Frequently tetany is observed in infectious diseases and in certain intoxications such as typhoid fever, influenza, Vincent's angina, malaria, polyarthritis, croupous pneumonia, etc. Intoxications by ergotine, lead, morphine, chloroform, phosphorus, carbon monoxide, ether, procaine, tuberculin, etc. may also occasion it. Tetany at times occurs after accidental removal of the parathyroids in thyroidectomy. It is quite frequent among certain workers such as tailors, locksmiths, turners, cobblers, etc. (so called *idiopathic tetany* or workman's tetany).

Apart from the peculiar connection with certain industries it is also indigent in certain cities and is seasonal in appearance. Mac R. Carrison reports that in certain valleys in the Himalaya region epidemic tetany is frequently observed. An increase of the epidemic in the spring months may be regularly observed. Tetany may accompany various disturbances of the gastrointestinal tract, especially benign pyloric stenosis, ileus, helminthiasis, severe bowel infections, etc.

A grave form of tetany is often observed during pregnancy, especially between the sixth and eighth months of gestation. Tetanic spasms may also be caused by too frequent or prolonged breathing (*hyperpnea*).

Epilepsy is one of the most frequent diseases connected with tetany. Tetanic convulsions sometimes pass quickly but may last for hours and

may start at the slightest irritation (Fig 12) Percussion of the abdominal wall for instance can provoke an acute attack Cases of latent tetany may become manifest by infectious diseases intoxications etc.

Skin pigmentation is rare in tetany bronze like pigmentation sometimes follows complete extirpation of the thyroid gland with symptoms of tetany predominating *Tetanic cataract* frequently observed in grave



Fig 12a—Tetanus During the height of attack. (Courtesy of Dr J H Hess)

infections becomes manifest between the eighteenth and fortieth year It is also found in children Here the development is conspicuously rapid Another common symptom of tetany is conjunctivitis Trophic changes affect the hair skin ciliary epithelium dental enamel etc The hair is often brittle defects of the dental enamel are frequent *Infantile tetany* (*spasmophilia*) is probably occasioned by hypofunction of the parathyroids Children from six months to four years of age are particularly affected especially when suffering from pluriglandular insufficiency

(severe rickets etc) The muscles of the face (*carp mouth of Thiemich*) and trunk become involved Here attacks are more frequent than in adult tetany Breathing becomes difficult accompanied by cyanosis pallor and loss of consciousness Between the fourth and eighth years spasmophilia is rare



FIG 12b—Tetanus After recovery (Courtesy of Dr J H Hess)

Addison's disease originally named the *bronze disease* because of the bronzed skin is occasioned by a failing function of the capsule of the suprarenal glands The victims are mainly men of middle age only very rarely are children and old people affected

The destruction of the gland is frequently occasioned by tuberculosis Both sides are usually affected Less frequent are sarcoma and carcinoma which when present are as a rule metastatic in origin and only seldom primary Other pathologic conditions which may be responsible for Addison's disease are hematomas gummas adenomas and hydroids Some cases present hypoplasia aplasia or atrophy of the glands

The characteristic pigmentation of the skin which is of great diagnostic importance usually starts at those parts of the body which are not covered by clothes and where the clothes exert some pressure. Parts of the face such as the lips and the edges of the eyelids are affected. On the buccal mucosa and the conjunctiva the pigment is distributed in patches. The color of the pigmented skin ranges from a light to a dark brown hue. Some



Fig. 13—Acromegaly. Patient at the age of 22

times the whole body becomes bronze colored. In colored patients the diagnosis presents some difficulties, of course, nevertheless the disease has been correctly diagnosed in Hindus, Arabs, Malaysians, etc. In some patients the pigmentation is limited to the face and to a few parts of the body. Addison's disease without any sign of pigmentation is extremely rare. Another conspicuous symptom of Addison's disease which, as stated before, develops in the third and fourth decade, is an asthenic and apathetic behaviorism—a certain somnolence. These patients are easily exhausted, tend to have fainting spells and show decreased mental capacity.

In some cases the psychic functions remain unchanged in spite of the physical weakness. The disease usually affects individuals of weak constitution particularly the tuberculous. Emaciation is common. Although



Fig. 14—Acromegaly. Same patient as in Fig. 13 at the age of 42 (Pershing.)

these patients become gradually pallid the number of erythrocytes and hemoglobin content differ.

Affections characterized by pigmentations which must not be confused with Addison's disease are *Biermer's anemia*, *lymphogranuloma*, *bronzed diabetes*, etc. Exophthalmic goiter may also show pigmentation. Hyperpigmentation is also frequently observed in scurvy, malaria, pellagra, and in its final stage *melanotic sarcoma*, *Framp's melanoderma*, and *arsenical melanosis*.

Acromegaly is characterized by an abnormal development especially of the bones of the face and extremities and is associated with disturbances of the pituitary body, the thyroid gland, etc. (Figs. 13 and 14). This disease



Fig. 15—Marked hirsutism in senile female probably on endocrine basis

begins usually between the third and fifth decades and in most cases is not accompanied by a symmetrical hypertrophy of the distal parts of the body. The nose, chin, zygomatic arch, orbit and tongue are frequently affected, resulting in a coarsened, disfigured face. The nose, chin and lower lip become especially lengthened and thickened; hypertrophy of the upper lip and upper jaw occurring less frequently. These parts, as well as the skull and brow, retain their normal shape. Hypertrophy of the ears, supraorbital and zygomatic regions is often observed. The tongue is abnormally thick and thickness of the occipital protuberance is found in almost all cases. In some cases various brain symptoms are noted, such as hemianopsia, disturbances of vision, paralysis of the eye muscles, as well as a severe psychic decline. Tall persons seem to be especially liable to the disease.

Thickening of the subcutaneous tissues is characteristic of acromegaly and myxedema, and the puffiness of the eyelids in myxedema may simulate the subcutaneous edema of renal disease. In certain cases an abnormally dry skin is encountered; in others the skin is moist and markedly flaccid.

The hair of the head often becomes luxuriant and the single hairs are thick. *Hypertrichosis* of the face in women often manifests itself as bristle, maxillary hairs, hairiness of the cheeks, and the formation of bristle hairs on the upper and lower lips (Fig. 15). The eyebrows too become shaggy. Sometimes loss of the cephalic or facial hair occurs, and if it grows again it is usually discolored and prematurely grey. In fully developed cases the change of the face can be so marked that the patients often are not recognized by those who had not seen them since the onset of the disease. The cartilages, superciliary ridges, the strongly protruding zygomatic arches, as well as the soft parts, share in the thickening of the grotesquely distorted nose. Sometimes narrowing of the auditory canals and orbitae occurs, the latter causing exophthalmos, which can also be produced by obstruction in the cavernous sinuses and enlargement of the bulbi. Increased tonus of the Mueller-Landstroem muscle may be the cause of protrusion of the eyeballs in cases accompanied by exophthalmic goiter.

The enlargement of the jaws, particularly of the lower jaw, may result in the characteristic gap of the teeth. The marked prognathism of the lower jaw, together with the oblique position of the alveolar apophysis, sometimes causes difficulties of mastication. The tongue may increase in size to such an extent as to project beyond the teeth in spite of the enlargement of the maxilla; this often causes disturbances of lingual articulation. The speech of females as well as of males becomes unusually loud. The larynx is frequently much enlarged. Most of the ductless glands are affected by hyperplastic processes, particularly the thyroid, suprarenal capsule



Fig 16a—Pituitary cachexia (Courtesy of Dr Lester Hollander)



Fig 16b—Pituitary cachexia (Courtesy of Dr Lester Hollander)

gourds, etc. Psychic changes and mental disturbance are expressed in marked apathy, lack of initiative, retarded speech. A state of agitation is rarer.

Among the numerous causes which may lead to dysfunction of the glandular hypophysis, infectious diseases play an important rôle. Of the primary diseases, tumor of the pituitary body is the commonest lesion. If it is composed of chromophil cells, which stain well with eosin, it results in *hyperpituitarism* (*gigantism* or *acromegaly*). If chromophobe cells, not staining with eosin, predominate, the clinical result is *hypopituitarism*. Occasionally, *basophil adenomata* are found causing adiposity and masculine characteristics similar to *suprarenal tumism*. Mixed tumors may cause confusion and mixed clinical syndromes.

Hyperpituitarism is the term applied to overactivity of the anterior lobe of the pituitary. As in *hypopituitarism*, the age of the patient modifies the result. *Gigantism* occurs in patients in whom overactivity of the gland occurs before the epiphyses have united. *Acromegaly* occurs with hyperpituitarism in adult life.

The usual type of pituitary underactivity is known as *dystrophia adiposogenitalis*. Children at puberty are generally affected, though the signs may persist to adult life (Figs 17 and 18).

A peculiar condition of the skin may be observed in *Frøehlich's syndrome*. The skin is alabaster white, sometimes dry and may show myxedematous swelling. Occasionally, there is complete loss of hair.

Pituitary dwarfism is the result of an imbalance in hypophysis function in early childhood. In these cases the upper half of the body is longer than the lower. Obesity with infantile dimensions is frequent. The skin shows premature atrophy and is often wrinkled in children, especially in males (Fig 19).

Pituitary cachexia represents a peculiarly rare aspect of hypopituitarism. It is characterized by gradually developing severe cachexia, pale wrinkled skin, general premature senility, loss of teeth, hair, and eye brows, severe general atrophy, and emacia. The loss of weight may amount to about 50 to 60 pounds. The flabby facial lines, the occasional peeling, sallow skin, toothless mouth, and skeletonlike atrophy, thinning of the hair and eyebrows, and atrophy of the maxilla combine to produce a horrifying impression of senility (Fig 16).

A rare form of fat dystrophy, the so-called *lipodystrophia*, is seen in women with an abnormal distribution of fat. The so-called *death head* face is caused by progressive dwindling of fat from the face. At the same

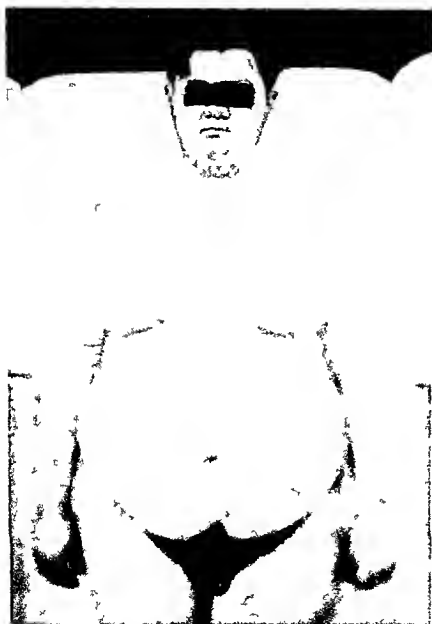


Fig 17—Dystrophia adiposogenitalis (Courtesy of Dr Lester Hollander)

time there is lipomatosis of the buttocks and lower extremities. This clinical picture was described by Parkes Weber, who compared the face and upper half of the body with that of a witch, the lower half to that of a Venus in *ultra* Rubens style.



Fig. 18.—Dystrophia adiposogenitalis. Froelich syndrome.
(Courtesy of Dr. Lester Hollander.)

In the etiology of the *endogenous emaciation* the endocrine system seems to participate. It plays its part in exophthalmic goiter and in Addison's disease. Different forms of emaciation are observed in various pathologic states of the ductless glands. The most marked degree of emaciation is observed in *hypophyseal cachexia*.



Fig 19—Achondroplastic dwarf

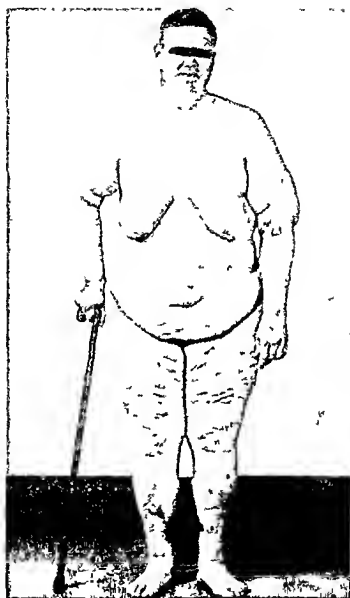


Fig 20a—Hermaphrodite. (Courtesy of Dr Lester Hollander)

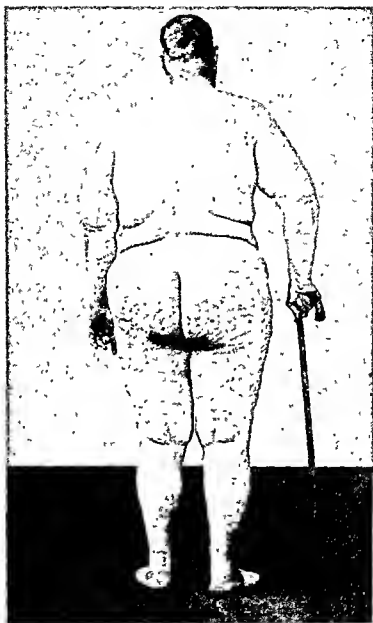


Fig. 20b—Hermaphrodite. (Courtesy of Dr. Lester Hollander.)



Fig 20c—Hermaphrodite (Courtesy of Dr Lester Hollander)



Fig. 20d—Facies of hermaphrodite. (Courtesy of Dr. Lester Hollander.)



Fig 20e—Facies of hermaphrodite (Courtesy of Dr Lester Hollander)



Fig. 21—Appearance of patient five years after autocastration. Note dejected appearance of patient and sparseness of hair on face

In *endogenous obesity* the constitutional peculiarities play a greater role than in *exogenous obesity*, although exogenous obesity may appear as a hereditary disease.

A determining influence of the development of obesity may be found in *failure of the gonads*. Disorders of the gonads are greatly responsible for certain characteristics of body and psychic qualities. Sexual character



Fig. 22—Eunuchoidism—autocastration

istics which are not in accordance with the primary sexual constitution are termed *sexual inversion*. *Homosexuality* is an obscure endocrine disturbance. The sex glands may participate in determining premature senility and failure in their function may be among the causes of pathologic senility as in hypophyseal cachexia and *multiple sclerosis of the ductless glands* if functional hypophyseal disturbances prevail.

Removal of the ovaries and testicles disturbs the endocrine function and in time the faces will give evidence of this disturbance. In women

masculine traits may develop in speech and growth of maxillary hair. In men the hair of the face becomes sparse and flushing of the cheeks and other feminine characteristics may develop (Figs 21 and 22).

The influence of the *pineal gland* (epiphysis) may become manifest by various signs. Changes in the reaction of the pupils, ophthalmoplegia, *déviatiou conjugée*, nystagmus, ataxia, paresis, bilateral convulsions of an epileptic character, deafness and rigidity of the neck belong to those symptoms.

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CHAPTER XVIII

DERMATOLOGICAL CONDITIONS AND THE FACE

THE appearance of the human skin which has to fulfill a variety of functions varies considerably in different races as well as in different individuals. To this multitude of normal appearances of the skin further variety is added by numerous manifestations of pathologic conditions of the skin.

The face and scalp are affected by many of the more common skin diseases such as *erythema multiforme*, *eczema impetigo contagiosa*, *dermatitis venenata*, ringworm, *herpes simplex*, *herpes zoster*, *acne rosacea*, *erysipelas*, *lupus vulgaris*, *seborrheic keratosis*, *molluscum contagiosum*, *xanthoma foliacearum*, *carcinoma cutis*, *lupus erythematosus*, secondary syphilis, milium, and anomalies of pigmentation. Diseases such as *urticaria gigans*, *herpes simplex*, *carcinoma cutis*, chancre, *cheilitis exfoliativa*, *cheilitis glandularis apostematosa*, and Fordyce's disease affect the lips. The tongue is affected by diseases such as *carcinoma*, chancre, *gumma*, *leukoplakia*, and transitory benign plaques.

Erythema multiforme (*erythema exudativum multiforme*, *erythema polymorphie*) is an inflammatory, acute skin disease with crimson red or purple-red macules, papules or nodules, and less often with vesicles or pustules (Fig. 1). It is usually limited to the face and neck, hands and forearms. The lesions vary greatly in their shape and size as the name indicates. Its most frequent type is *erythema papulatum*. The lesions develop from within 12 to 24 hours. It occurs mostly in spring and fall. Younger people are more frequently affected. The etiology is not uniformly explained; different authors hold different causes responsible. The disease is more serious in Europe than in the United States. In Europe the patients usually get well in from two to five weeks. Recurrences are frequent. The buccal mucous membrane is seldom affected. Sometimes the tongue is involved; sometimes the lips as well as the tongue.

Angioneurotic edema (*giant urticaria*, *Quincke's edema*, *urticaria edematosa*) is a neurosis characterized by the presence of circumscribed noninflammatory swellings. It appears suddenly and lasts from a few hours to a day or two. A favorite site is the upper lip. The tendency to recurrence is marked. The lesions vary in size, shape, and color. The lesions on the eyelids usually vary from one to two inches in diameter but may reach such sizes as to entirely distort the features of the face. After the sixtieth year the disease is rare; it occurs mostly during the



Fig. 1—*Erythema multiforme*.
(Courtesy of Drs. Oliver S. Ormsby and David V. Omens.)

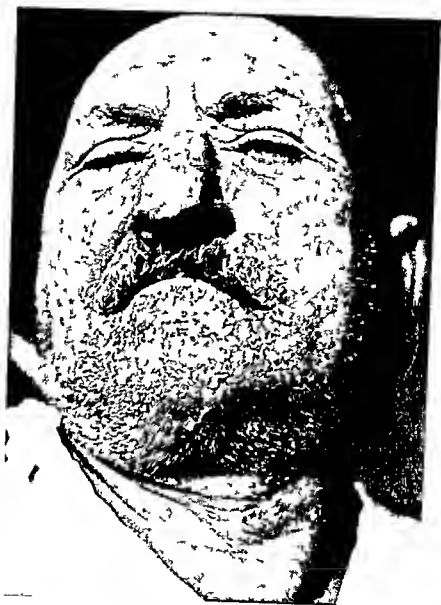


Fig 2—Dermatitis venenata.

early period of adult life. Predisposing causes are supposed to be nervous factors, alcoholism, malaria, menstrual disturbances, overwork, mental exhaustion, and other conditions. Some cases persist for years.

Lichen planus (*lichen ruber planus*), inflammation of the skin with broad flat papules reddish or violaceous of the size of a pinhead, is usually



Fig. 3—Fixed circumoral phenolphthalein eruption (phenolphthalein sensitivity)

accompanied by severe itching. The acute form may change and become chronic. The face and scalp usually escape, but the mucous membranes are often attacked and lesions may involve the tongue. Whitish streaks or patches develop in the buccal cavity and on the tongue.

Erythema traumaticum is caused by external contacts such as pressure, friction, rubbing, scratching. It appears, for example, on the sides of the nose where eyeglasses exert pressure. Exudative affections may develop



Fig. 4—Mercury deposit in skin (Courtesy of Dr. Lester Hollander)

from the simple erythema if the causing traumata persist for a long time or are of a severe nature

Prurigo a chronic papular skin disease with intense itching begins usually in infancy or early childhood and continues through life. Typical *prurigo ferox* is chiefly observed in Austria. A milder type *prurigo mitis* is found more often in America than in the former country. An urticarial rash first appears followed later by papules with no marked color distinction from the skin color. Due to the intolerable itching and consequent scratching the pruritic papules become covered with blood impregnated crusts. A dark brown pigmentation finally discolors the skin. Although the extremities are mostly affected neck face and scalp may also be afflicted. Hebra (*prurigo of Hebra*) observed that the severity of the outbreak increased downward from the scalp. He and Kaposi found a hereditary predisposition. Male patients are more often seen to be affected than females. The disease is not contagious.

Extreme cold causes inflammation of the skin of varying degrees which is similar to that caused by extreme heat. Usually the cheeks nose ears and other exposed parts of the body are attacked by exposure to severe cold. The first degree of the resulting dermatitis congelationis may be followed by hyperemia and edema. In the second degree the former are complicated by the development of bullae and vesicles. Gangrene may develop in the third degree.

Dermatitis venenata is an acute skin inflammation caused by external factors of animal plant or chemical origin. It is characterized by redness swellings vesicles bullae and varying grades of burning and itching (Fig 2). The first symptom is usually a form of erythema limited to the area of contact with the irritating agent. It lasts usually for a period of one to three weeks. Gangrene may develop. New areas besides the one affected by contact may finally be involved. Individual susceptibility plays an important role. Hereditary predisposition also is observed. A frequent cause of acute dermatitis of the forehead eyes face and neck is found in some hair dyes and furs. Often paraphenylenediamine a frequent chemical compound of dyestuffs is responsible.

Drugs may induce *dermatitis medicamentosa* or drug eruptions (Figs 3 and 4). They usually appear suddenly and recede when the use of the drug is discontinued. Exceptions are observed in the use of iodine and bromine. Drug eruptions usually develop after a prolonged use and they disappear slowly. Women and children are more liable to drug eruptions. Idiosyncrasy acquired or inherited is a very important factor in acquiring this type of dermatitis. In cases caused by iodine compounds the sites of predilection are usually those rich in sebaceous glands face back and



Fig. 5—Scarred face of acne (Courtesy of Dr. Lester Hollander)

shoulders. Sometimes the mucous membranes are involved. The lesions may be confluent with suppuration and ulceration.

Acne urticata neurotic excoriations seem to be caused by a disturbance of the nervous system. The lesions appear mostly on the face and neck.



Fig 6—Acne vulgaris
(Courtesy of Drs Oliver S Ormsby and David V Omens)

chest and limbs but any part of the body that can be reached by the hands may become affected. The excoriations are of irregular or oval shape; they sometimes are ulcers covered with crusts, pigmented spots, and scars (Fig 5). The patient seems to be obsessed by the wish to remove some foreign body supposed to be in the skin. The sensation of itching is tormenting. Women more liable to the disease than men are usually older than 30 years when affected.



Fig. 7—Acne rosacea

Acne vulgaris is an inflammatory condition of the pilosebaceous structures which are characterized by papules, nodules, and pustules and are often associated with comedones occurring chiefly over the face, chest, and back. It occurs most frequently between the ages of 12 and 30 years and



Fig. 8—Rhinophyma

may be more severe at puberty and adolescence when all the glands are in a state of hyperactivity (Fig. 6)

Acne rosacea likewise is a chronic lesion. It is characterized by hyperemia and telangiectasis (Fig. 7). *Rhinophyma* may be the end result of *acne rosacea* in which case marked hypertrophy of the tissues of the nose occurs producing lobulated masses of variable size. Sometimes pendulous masses are produced. The course of the disease is chronic with no subjective sensation. *Rhinophyma* occurs more frequently in women than in men (Fig. 8)

Radiodermatitis (roentgen ray dermatitis) may be induced as an acute or chronic inflammation of the skin from the use of x rays or radium (*dermatitis actinica*). The first symptom erythema or pigmentation may appear a few days after exposure or after a much longer period as after three months or longer. In severe acute cases vesicles and bullae develop and later a more or less marked necrosis and sloughing may occur. Brownish or grayish ulcers follow causing extreme pain and healing occurs very slowly if at all.

Eczema is an inflammation of the skin with exudation of lymph. It may be acute, subacute or chronic. Clinically several types of eczema are observed. Mostly mixed types are seen at the same time or follow successively. Itching or burning reduces sensation of heat, erythema or papules, vesicles and pustules are characteristic symptoms. Later crusts, infiltration and scaling develop. *Erythematous eczema* is seen frequently on the face being the commonest form of eczema affecting the face of adults. Exposure to weather and wind as well as to heat or sun rays is a predisposing factor. The lesions may consist of patches ill defined, dry, reddish or pinkish accompanied by swelling and edema. The edema may be very marked in acute cases so that the eyes become closed. In the more frequent types (subacute and chronic) the swelling is less pronounced but infiltration and thickening of the skin are observed. *Chronic eczema* (fig. 9) may show papular, erythematous or squamous lesions. Erythematous lesions are commonest in eczema of the face. Acute eczema shows a large number of severe lesions. The color of the face is dusky red or bright or purplish red depending upon the severity of the disease. Sometimes a yellowish hue is observed probably due to the location of many sebaceous glands about the face. The disease has a tendency to recur. In later life it may persist for years.

Papular eczema appears usually on the limbs and the trunk but may affect any part of the body. *Eczema squamosum* is often seen on the face. It is frequently accompanied by itching. It is present as a transitional stage of eczema with a moderate grade of inflammation and patches covered with dry thin scales. The *erythematous and squamous types of eczema* frequently appear on the scalp with an unusually circumscribed eruption. The patches are usually well defined. The eczema may follow a stage of preceding pruritus.

Eczema of the ears (eczema aurium) is often accompanied by considerable edema. It may develop from a seborrheic dermatitis or a discharge from the auditory meatus may be responsible. The postauricular area is mostly affected. The erythematous and scaling form of the eczema may affect the lobules resulting in thickening and deformation and dark red

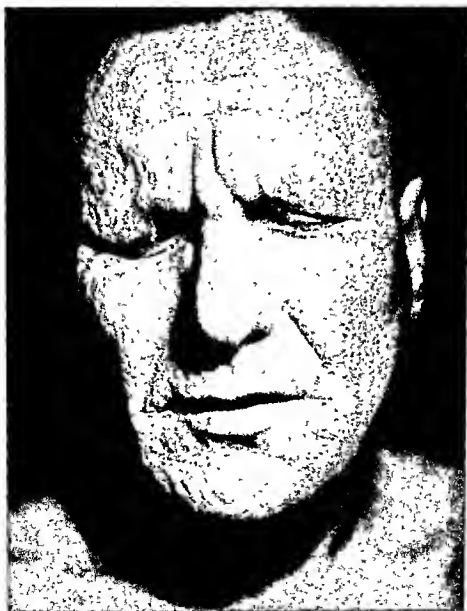


Fig. 9—Chronic eczema of the face.

discoloration. The pustules may project to a considerable extent from the side of the head due to their enlarged size and may be uniformly deep red and infiltrated.



Fig. 10—*Derma-titis seborrheica*
(Courtesy of Drs. Oliver S. Ormsby and David V. Omens.)

The papular, vesicular, and mixed forms of eczema may appear in the bearded region usually not confined to the hair-covered area but overlapping on the hairless skin.

Eczema of the lips (eczema labiorum) presents often the chronic type because it is constantly aggravated by local irritation. Fissures are common resulting from erythematous lesions, pustules, and vesicles followed

by infiltration and thickening. Complication by the nasal discharge may cause a thickened and elephantiasic upper lip.

Eczema of the nostrils (eczema narium) may affect the mucous membranes as well as the adjoining skin. The inflammatory infiltration may cause thickening of the nostrils and develop fissures especially at the lines of the nares inferiorly and laterally. Often it is associated with sycosis and furunculosis, involvement of the upper lip is also seen.

Eczema of the eyelids (eczema palpebrarum) may affect the skin especially over the orbital margin of the tarsal cartilage or the free edges of the lids. The lids may become agglutinated by purulent discharge and folliculitis. Crusts are seen sticking to the eyelashes and the lids become thickened and swollen. *Tinea tarsi, blepharitis*, an inflammatory process of the meibomian follicles is frequently present. The conjunctivae may be involved. A subacute inflammation with a brownish tint of the skin is often present in adults. The degree of itching varies.

Infectious eczematoid dermatitis (pustular eczema or impetiginous eczema) is characterized by the appearance of erythematous pustular vesicular or scaly circumscribed patches or moist and crust-covered lesions. In severe forms a rapidly spreading discharging surface appears. In a relatively short time the epidermis may become removed over a large area. A marked edema develops over the face and other areas. Staphylococci especially *Staphylococcus albus* are responsible for the condition.

Dermatitis seborrheica begins on the scalp and frequently extends to the ears, temples, forehead, neck, and may appear on any part of the body (Fig. 10). Such spreading may be rapid or slow in the form of circumscribed reddened and scaling patches resembling psoriasis. This condition is possibly due to the *pytrophoron of Mallaszez* and may be transmitted from one individual to another.

Psoriasis, a chronic sometimes acute inflammation of the skin with scale formation shows flat papules of reddish brown color or circumscribed plaques covered with silvery white scales. In typical cases the plaques and papules are well defined and slightly raised. The shape and size of the eruptions vary greatly. The second and third decades of life seem to be mostly affected and heredity apparently plays a part in predisposition. It occurs very seldom in dark colored races. In warmer seasons and climates psoriasis occurs less often than in winter and in cold climates.

Impetigo contagiosa (impetigo vulgaris, impetigo staphylogenes) a contagious skin disease is characterized by pustules, vesicles and superficial crusts. It usually appears on exposed parts of the body such as the face and hands. The size and shape of the lesions vary greatly. Sometimes the mucous membranes are involved. The crusts are honey colored, lea-



Fig. 11.—*Impetigo contagiosa*.
(Courtesy of Drs. Oliver S. Ormsby and David V. Omens.)



Fig. 12—Impetigo contagiosa
(Courtesy of Drs. Oliver S. Ormsby and David V. Omens.)

in, beneath a superficial erosion which is well defined. Streptococci and staphylococci are held to be responsible as etiologic factors. The disease presents a pus infection transmitted to the skin frequently by the finger nails. The barber shop is a common source of infection for men (Figs 11 and 12).

Anthrax (malignant pustule splenic fever carbuncle) an acute infection caused by *Bacillus anthracis* shows a gangrenous carbunclelike lesion mostly single. It may appear on the face hands head and neck. Papules and bullae develop with an inflammatory infiltration. The bulla containing pus and blood soon opens. Sometimes the skin infection is accompanied by intense swelling and edema. Animals with splenic fever coming in contact with people are responsible as well as the hide wool hair and carcasses of such animals. Shaving brushes with infected hairs have been found to be frequent sources of infection.

A contagious disease of horses often transmitted to man is *equinia* (glanders farcy malleus). It is also transmitted by the mule or ass and is caused by *Bacillus mallei*. An abrasion on the skin may furnish the point of entry frequently on exposed skin surfaces such as the face hands and neck. The mucous membranes of the nose and mouth also may permit entrance of infection. When infection occurs through the skin a reddened painful swelling appears breaks down soon and forms a quickly enlarged ulcer with a purulent hemorrhagic discharge. After a period varying from a few days to a month cutaneous lesions develop. These lesions present at first dark red spots later yellowish papules form. Ulcers enlarge and coalesce finally covering large surfaces. Between them are black gangrenous patches. There are different additional complications for instance deep abscesses which develop in the subcutaneous tissues. The prognosis is very serious and treatment usually is of no avail. Sometimes death may occur before the cutaneous lesions develop.

Erysipelas (St. Anthony's fire) is a contagious infectious skin disease accompanied by fever and constitutional disturbances characterized by patches slightly raised well defined or irregular in shape (Fig 13). They are of a pinkish or crimson red color. The parts of the skin attacked become swollen with a shining or glazed smooth surface. Later after involution hues of brown dirty white and bluish red follow the redness of the epidermis which finally desquamates. Edema is often present especially in cases where the face and the ears are involved. In severe cases extension of the inflammation becomes rapid. The entire head may become very much swollen giving the patient a grotesque disfigured appearance. The lips are scarlet red parted and swollen thus permitting the escape of saliva

The swollen ears may project from the sides of the head. The eyelids are disfigured by marked edema. After recovery there is usually loss of the hair. *Streptococci of Fehleisen* or other organisms are the cause. Entrance



Fig. 13—Erysipelas.

to the tissues occurs through skin lesions, not infrequently through surgical or other wounds. Catarrhs and ulcers of the mucous membranes of the mouth, ears, and nose are often etiologic factors for erysipelas of the face. Syphilis of the nasal bones or carious teeth often initiate the affection. Epidemic influences, idiosyncrasy, kidney disease, general debility, alcoholism, and cachexia are supposed to be predisposing causes. Most of the

patients recover during a few days or weeks. However, when there is affection of the deeper tissues with involvement of the scalp, which occurs, for instance, in confirmed alcoholics and puerperal women, the disease may be fatal.



Fig. 14—Herpes facialis.
(Courtesy of Drs. Oliver & Ormsby and David A. Omens.)

Solid edema of the face (recurrent erysipelatous attacks on the face) affects the face, is a solid edematous swelling, especially of the upper lip and the eyelids. Recurrences may appear at different intervals. Sometimes the edema becomes permanent. The streptococcus is believed to cause the disease, gaining entrance through the nasal mucous membrane, the mouth, gums or eyes.

Herpes simplex (fever blisters) is an acute eruption in the form of vesicles resting on a moderately inflamed base. The regions of predilection are the face and genitalia. It is accompanied by a sensation of burn-



Fig. 15—Herpes zoster.

ing. Infectious diseases, such as cerebrospinal meningitis, pneumonia, and malaria, are often associated with herpes. In herpes facialis, the areas of predilection are frequently the lips, the perioral region, and the cheeks; sometimes the external ear, especially the auricle, may be affected (Fig. 14). Occasionally the inner surfaces of the lips are attacked. The nose also is

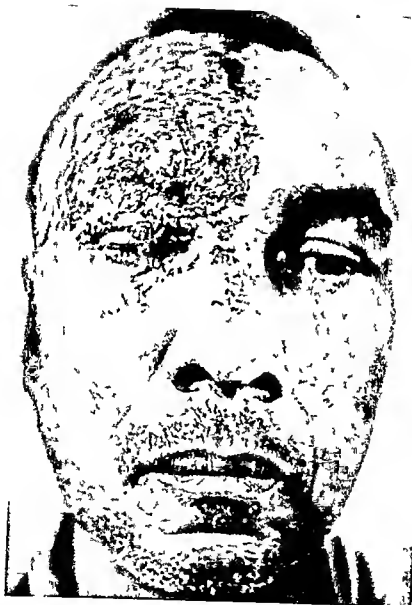


Fig. 16—Herpes zoster ophthalmicus

often affected. The vesicles vary in size from that of a pinhead to that of a pea. They usually contain serum and after rupture may become covered with light crusts. They tend to recur after healing. *Herpes zoster* (shingles



Fig. 17—*Pemphigus erythematodes*, a benign type of chronic pemphigus (Courtesy of Drs. Oliver S. Ormsby and David V. Omens)

zoster, *zona ignis sacer*, *herpeton*) is an acute disease which is characterized by the appearance of grouped vesicles on an inflamed base (Fig. 15). It seldom recurs. The occurrence of eruptions may be preceded by sensation of itching or hyperesthesia. People with lowered nervous resistance are more apt to be affected. It occurs in both sexes and at all periods of life but is seldom encountered during infancy. In the spring and autumn more cases are observed than at other seasons. Infectious diseases, trauma

and chemical toxins (arsenic, for instance) are etiologic factors. Its course is acute in most of the cases, disappearing within two to four weeks.

Gangrenous and hemorrhagic cases are more serious. *Herpes zoster frontalis* appears in the region which is supplied by the supraorbital nerve. A grave form of *herpes zoster* may become *herpes zoster ophthalmicus*, often accompanied by severe neuralgia and involvement of the different parts of the eye (Fig. 16). Corneal perforation, panophthalmitis, meningitis and death may result.

Pemphigus (pompholyx) may be acute or chronic and is characterized by bullae developing in cycles or in continuous succession. They develop suddenly and may be accompanied by constitutional disturbances. *Pemphigus acutus (acute infectious bullous dermatitis)* is described following septic wounds and vaccination. Development of lesions may start in the mouth, about the neck, or in other parts of the body. The size of the bullae varies from that of a pea to that of an egg; the lesions spread quickly and finally cover large areas; they are round or oval and are filled with serum which later becomes purulent or hemorrhagic. In severe cases the bullae coalesce and due to abrasion large surfaces of the skin become denuded. In many cases the disease follows an infected wound. It occurs frequently in butchers after they are bitten by animals. The mouth, palate, eyes and nostrils are commonly affected. Bacterial factors seem of etiological importance. The prognosis is grave.

The commonest type of pemphigus is *pemphigus vulgaris* or *pemphigus chronicus*. The mucous membranes are usually involved besides other parts of the body. The bullae may become ruptured and be followed by crusts. As in all cases of pemphigus the prognosis is dark. A group of cases with a relatively benign course was described by Senear and Usher. The bullae appearing on the body are associated with lupus-erythematosus like seborrheic lesions on the face (Fig. 17).

Pemphigus foliaceus (Fig. 18) is marked by crops of flaccid blebs; it may start as one of the dermatoses, a generalized edema of the skin, etc. The lesions rupture rapidly, leaving a moist raw surface. The skin becomes thickened and infiltrated. Sometimes successive bullae form in the same area. After rupture yellowish brown crusts cover the bullae and in most cases the entire surface becomes involved. The mouth and throat also are affected as well as the scalp. Sometimes there is complete loss of hair. As to the etiology, hypotheses vary; some support a neuropathic, some a parasitic theory. The course of the disease is usually fatal.

Pemphigus vegetans (Fig. 19) a form in which the bullae are followed by papillary growths; starts with eruptions on a mucous surface, frequently the mouth or pharynx. Later the nares and other parts of the body may



Fig. 18—*Pemphigus foliaceus*

become affected. The prognosis here is also serious. *Dermatitis vegetans* (*pyodermatitis vegetans*) follows the lesions of some preceding disorder such as seborrheic dermatitis or eczema. In contrast to pemphigus vegetans which it resembles in its clinical picture it responds readily to antiseptic treatments. The plaques varying in size and distribution are of dark red color and bleed easily. Sometimes they are covered with crusts, sometimes the face only is affected. After treatment pigmentation remains which gradually disappears. Sometimes scarring is observed after the disease.

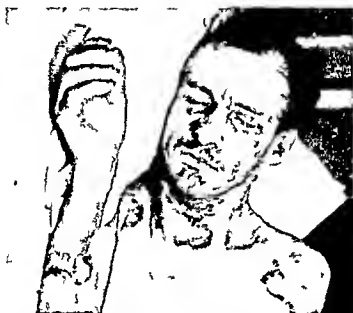


Fig. 19—Pemphigus vegetans

Epidermolysis bullosa (*acanthosis bullosa epidermolysis bullosa hereditaria acantholysis bullosa*) is rare and is characterized by the appearance of vesicles or bullae produced by slight traumatism. Although in many cases the disease occurs in early infancy it does not become manifest sometimes until later in life. It may appear in several members of the same family and over several generations. In the simple type irritation or trauma is followed by development of bullae seldom affecting the mucous membrane. In the dystrophic type the lesions appear mostly on the extremities and are often hemorrhagic. Scarring and pigmentation follow. The mucous membranes of the mouth and tongue may be involved showing bullae, infiltrated areas and patches of leukoplakia. The scalp, eyelashes and eyebrows may be affected. Sometimes it is associated with



Fig. 20—Pellagra (Dr. Tivoli et in *Aesculape*)

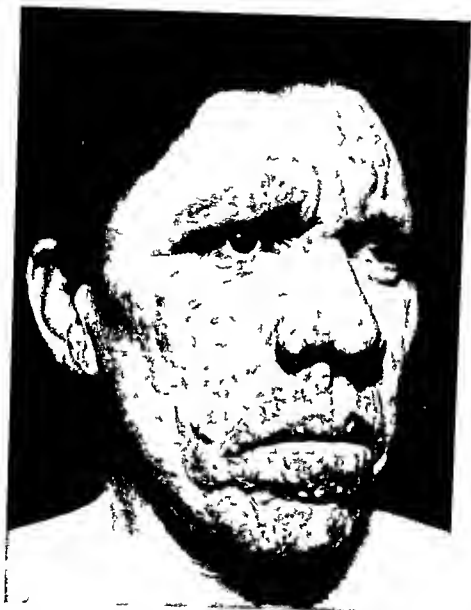


Fig. 21—Pellagra.
(Courtesy of Drs. Oliver S. Ormsby and David V. Orms)

partial alopecia. Treatments are usually without avail and the disease seldom disappears.

Pellagra (*Lombardian leprosy*, *risipola lombarda*, *lepra italica dermatogra*) is characterized by digestive disturbances, skin lesions and nervous symptoms (Figs 20 and 21). It is endemic in Italy, Spain, Egypt, the Tyrol and other countries and in the southern United States. In most cases some parts of the face, scalp or neck are involved as well as other parts of the body. The lesions are symmetrically arranged, the first ones light or dark red with large well defined macules. Soon they coalesce forming patches resembling dermatitis from sunburn. It shows a tendency to seasonal recurrence and is mostly observed in spring and fall. In a more advanced stage the color of the eruption becomes reddish or chocolate brown. After about a week or longer desquamation starts. Sometimes the skin is covered with crusts. In serious cases ulcers may develop. After several occurrences the skin becomes permanently thickened, coarse, scaly and pigmented. The lesions are always well defined, whether they are of the bullous or erythematous type. The chronic insane seem to be particularly apt to be affected. Different etiological factors are held responsible: food deficiency or the eating of diseased maize, infection with some living microorganism, etc. In the earlier and mild types of the disease the prognosis is less serious than in severe cases where recovery seldom occurs.

Scarlatina (*scarlet fever*, *canker rash*) is an extremely contagious disease with erythematous lesions becoming manifest by the second day, desquamation begins at the end of the first week. Besides other symptoms the eruptions are characteristic, beginning about the neck and the clavicular area. They spread quickly to the face and downward as many red points. They are fully developed at the end of the third or fourth day as closely set macules of the size of a pinhead or larger and are of a scarlet color. The picture presented by the face shows the area around the mouth usually free of eruption. A few lesions may appear on the forehead and temples. The tongue also is characteristic. In the early stage it is covered with a yellowish white coat and interspersed are red fungiform elevated papillae. Afterwards the tip and side of the tongue become more reddened, the coating disappears and the red surface appears raw or glazed with papillary protrusions characteristic of the so-called *strawberry tongue* of scarlet fever. The disease affects all ages and sexes, although it is especially frequent in children. It is generally believed that a *Streptococcus hemolyticus*, isolated by Dick and Dick, is responsible.

Rubeola (*morbili*, *measles*) is a contagious and infectious disease which is characterized among other symptoms by a diffuse macular eruption followed by desquamation. The mucous membranes of the mouth and

throat often show a punctiform eruption. The tongue is coated. The lesions of the mucous membrane of the mouth consist of small irregular red spots with a bluish white point or plaque in the center (*Koplik's spots*). After four or five days the eruption disappears. The prognosis is usually favorable.

Varicella (*smallpox*) is an acute infectious and contagious disease with a papular eruption later vesicular and pustular which results in incrustation. It may or may not leave scars. The initial rash may be erythematous or hemorrhagic and usually appears on the second or third day. The forehead and flexor muscles are generally first attacked. The smallpox eruption appears usually on the third or fourth day on the face and scalp. About the sixth day of eruption the vesicles become purulent and turbid. The face becomes swollen and may be grossly disfigured. The eyelids, nose, lips, and ears may also be affected by swelling. The mucous membranes of the mouth, nose, pharynx, larynx, and lips become involved. The symptoms decline between the eleventh and twelfth days, sometimes a little later. *Confluent variola* is a severe form of the disease with rapid and extensive development of eruption. Confluence is confined to the eruption of the face, hands, and feet. The face is very much disfigured by edema and tumefaction.

Hemorrhagic variola (*black smallpox*, *variola nigra maligna*) with hemorrhage occurring into the vesicles which gives them a blackish appearance is characterized by two forms of lesions. One has scarlatiniform eruptions appearing on the trunk and extremities. The face is swollen and the eyes show ecchymoses upon the conjunctiva. The other form, *variola pustulosa hemorrhagica*, shows the vesicles or pustules filled with blood.

Acanthosis nigricans (*leucosis nigricans*) is characterized by hyperpigmentation and papillary hypertrophy. It is a rare disease occurring in the juvenile form which is benign and the adult form which usually is malignant. The color of the patches is of a deep black shade, sometimes yellow or brown. The pigmented regions are more or less covered with nodules, papillomatous growths, or vegetating masses. Often molelike growths are present. Alopecia may affect the scalp. The face, lips, mouth, and other regions are frequently affected. In most of the cases of the adult type a cancerous involvement of some of the internal organs such as the liver, stomach, and uterus is observed. The prognosis in cases with abdominal carcinoma is severe. In juvenile cases the prognosis is not grave although the disease is usually persistent.

Cornu cutaneum (*cutaneous horn*, *cornu humanum*) is a horny excrescence on the skin which varies greatly in size and shape. Sometimes it

projects from the scalp forehead temples nose lips and cheeks Human horns consist of dense columns of epithelial cells The color often is yellowish brown or brownish black with either a smooth or rough wrinkled surface These horns appear more frequently in elderly persons although all periods of life may be affected Persons exposed to wind weather and excessive sunlight are more susceptible



Fig. 22—Keratosis follicularis (Alligator boy)

Keratosis senilis (*keratosis seborrheica senile wart*) presents a keratotic lesion which is usually flat of yellowish brown color crusted or scaly They appear in those past middle age usually after the sixtieth year especially over the temples and other parts of the face such as the nose and ear Often these lesions are associated with other changes characteristic of senile skin hyperpigmentation atrophy and excessive dryness They are usually moderately raised Their type may change into malignant growths

Keratosis follicularis (*isoriasispermia*, *Darier's disease*, *keratosis vegetans*, *ichthyosis follicularis*) shows papules becoming covered with crusts



Fig. 23—Nevus verrucosus.
(Courtesy of Drs. Oliver S. Ormsby and David V. Omens.)

(Fig. 22). They coalesce and form papillomatous, vegetating, and tumor-like growths. The face and scalp are usually first affected, then the eruption spreads downward. The papules increase in size which at first was that



Fig. 24—Multiple nevus pilosus
(Courtesy of Drs. Oliver S. Ormsby and David V. Ormsby)

of only a pinhead; they become darker, finally dark brown, red, and purple. The scalp resembles the one affected by the crusting type of seborrhea but usually there is no loss of hair. The areas of predilection on the face are the temples, the inside of the concha of the ears, and the folds about the lips and nose. In most cases the disease starts in childhood. Heredity seems to be an etiological factor and the outlook for recovery is poor.

Verruca digitata appears mostly on the scalp, face, and side of the neck. These warts are fingerlike projections with a horny cap (Fig. 23). *Verruca*

filiformis is generally more circumscribed than *verruca digitata*. The face and the eyelids are often affected and sometimes the tongue is involved.

Pigmented moles are congenital circumscribed accumulations of pigment in the skin developing with or without other skin changes (Fig. 24).



Fig. 25—Nevus flammeus (port wine mark)
(Courtesy of Drs. Oliver S. Ormsby and David A. Omens)

These pigmentations vary in color. They may be single or multiple, vary in size and shape. They usually appear during the first year of life but may be delayed until puberty or even later. During the first few years they gradually increase in size with no elevation. At puberty they begin to project from the cutaneous surface. They occur in both sexes and in all

regions of the skin, especially the face, neck, trunk, thighs, buttocks, and external genitals

Nevus flammeus, part wine mark, appears on the face and neck and less frequently on the trunk and limbs. The lesions may be small or large



Fig. 26—Hairy birthmark (Courtesy of Dr. V. A. Kazanjan.)

The surface is smooth or it may be dotted with small nodular tumors. They are of a purplish red color. Crying, coughing and exposure to cold produce changes in color (Fig. 25). Occasionally a hairy birthmark will occur (Fig. 26).

Elephantiasis (pachyderma, bucnemia tropica) is a chronic edematous disease of the skin with hypertrophy of the cellular tissue, which may result in pronounced deformity. It is endemic in tropical countries and sporadic in other regions. The face may be affected among other parts of the body. The type of the disease usually of endemic appearance, is generally the result of infection with *Filaria sanguinis hominis*. The other type, which

usually occurs sporadically (*elephantiasis nostras*) shows essentially the same symptoms as the endemic form but they are less pronounced. There is a succession of the attacks observed with cellulitis of bacterial source. The attacked areas become red and swollen. *Elephantiasis nostras* is believed to be caused by *Streptococcus pyogenes* the streptococcus of *Fehleisen*. Some congenital cases are reported. It also may be associated with late syphilis. After continued attacks the enlargements of the parts affected may become enormous.

Blepharochalasis a disease of the upper eyelids with a permanent swelling of the lids usually appears bilaterally. It is characterized by thinning of the skin and bagginess of the eyelids and occurs more often in young girls however it may affect all ages and sexes.

Freckles (ephelides) circumscribed pigmented spots may vary from the size of a pinhead to that of a pea or larger. They are yellowish brown and appear usually on exposed surfaces such as the face, neck, and hands. Sometimes the pigmented spots coalesce. They seldom occur before the sixth or seventh year of life. Sometimes they fade with the approach of winter at other times they remain without marked alteration. Some skins are especially susceptible to pigmentation when exposed to sunlight.

Chloasma idiopathicum may be caused by external agents such as pressure and friction, trauma, excessive heat, and toxic applications. It presents an anomaly of pigmentation (liver spots) of varying shades which may persist or become permanent affecting the face or other parts of the body. Mostly young women are affected. The spots are of no consequence other than their embarrassing appearance and certainly have nothing in common with derangements of the liver.

The pigmentation in Addison's disease is frequently manifest over the face and neck as well as over parts of the body. The hairs become coarse and darkened. The skin becomes bronze colored or mulatto-like in color.

Argyria with a bluish, bluish-gray, slate-colored or bronze-colored pigmentation of the skin may be caused from ingestion of silver nitrate (Fig. 27). Sometimes it affects the eyelids, the nose, and cheeks. *Melanosus* shows pigmentation of light brown to dark brown macules of lentil shape and large patches particularly affecting the face and neck. It starts with a slight erythema accompanied by itching and scaling. It develops over a period of several months and improves slowly.

Albinism (congenital leukoderma, congenital leukasmus, congenital achromia) is characterized by a congenital absence of the pigment of the skin, hair, and eyes completely or partially. The skin appears white or slightly pinkish. The hairs may be white, yellowish white, or red. The iris is transparent or pink. Due to lack of pigment in the choroid, the pupil

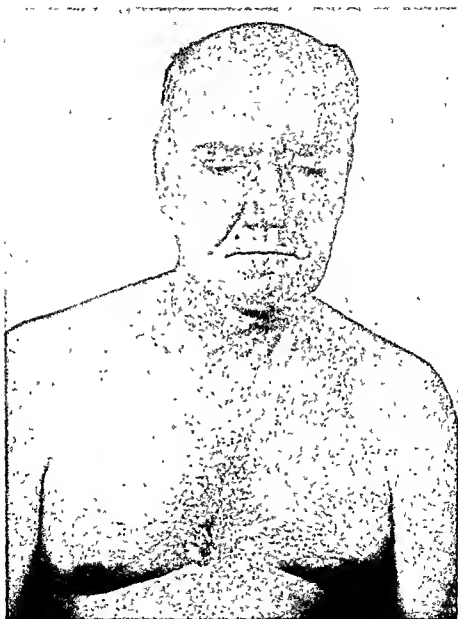


Fig. 27—Silver deposit—argyria. (Courtesy of Dr. Lester Hollander.)

appears red or pinkish. The anomaly occurs in families, often affecting several members, and it occurs in the white as well as in the colored races.



Fig. 28—Vitiligo
(Courtesy of Drs. Oliver S. Ornby and David A. Onions)

Vitiligo (*acquired achromia leukopathia piebald skin*) is an acquired achromia of the skin with patches of varying shape and size of milky white appearance may affect the face, neck, and other parts of the body (Fig. 28). Sometimes the hairs also appear depigmented. It is more manifest in the summer months on exposed surfaces. It occurs frequently during the twentieth and thirtieth year of life and is observed in association with certain skin diseases such as lichen planus, psoriasis, alopecia areata, a local

pruritus or with other diseases such as syphilis myxedema and exophthalmic goiter. Neurotic persons seem to be more susceptible. After development of the disorder it remains without change. It occurs in



Fig. 29—Trichotillomania
(Courtesy of Drs. Oliver S. Ormsby and David V. Omens.)

colored as well as in white persons and at times absence of skin pigment becomes complete.

Pruritus is characterized by itching and similar sensations and is primarily without lesional changes. Occasionally pruritus is limited to the scalp and face. Pruritus hiemalis appears with the approach of winter and disappears in milder weather. Adults with dry and harsh skin are especially susceptible. Primary eruptions are absent; the secondary ones consist of

manifestations due to self injury from scratching such as perifollicular redness excoriations crusts covered with blood and eventually an induced dermatitis. The corresponding *pruritus aestivalis*, appearing at the advent



Fig. 30.—Ringworm.
(Courtesy of Drs. Oliver S. Ormsby and David V. Orms.)

of summer and lasting throughout the season is less common than *pruritus hiemalis*. Nervous disorders are important etiological factors. The main predisposing cause is cutaneous hyperesthesia (Bronson).

Trichotillomania (Fig. 29) (*trichomania*) is characterized by a pathologic desire to pull out the hair. The scalp, beard, eyelashes and eyebrows are mostly attacked. *Trichokryptomania* is a similar disorder in which the patient breaks off the hairs.

Favus (*tinea favosa*, honeycomb ringworm, *dermatomycosis favosa*) is a parasitic affection due to *Achorion schoenleinii*, a vegetable parasite.

The scalp is frequently affected. Yellowish crusts (scrofulous) of the size of a pinhead to a pea develop on the afflicted parts. It leads to loss of hair



Fig. 31.—*Tinea circinata* of chin.

and in severe cases to total loss due to atrophy of the hair follicles. The bald surface of the scalp may become covered with cicatrices first of a deep red color which later fades. Generally the course of the disease which is contagious is chronic and develops slowly. Some individuals seem to be especially predisposed to the affection. Usually it occurs from infancy to the third decade of life. If the disease is treated early the prognosis is usually favorable.

Trichophytosis (ringworm) (Fig 30) is also due to vegetable fungi *Trichophytosis corporis* (*tinea circinata* (Fig 31), *herpes tonsurans*, ring worm of the body) appears in a dry and moist form. The dry or macular type shows one or several circles the size of a pea to that of a coin of red dish color sometimes slightly elevated. The center of the circle may be of paler color, and therefore the patch appears as an annular lesion leading to the given name of ringworm. Sometimes two or more patches coalesce. It usually attacks exposed surfaces of the body such as the forehead and neck. The moist type of the disorder is characterized by vesicles and pustules. The lesions spread peripherally as does the dry form.

Trichophytosis capitis (*tinea tonsurans*, ringworm of the scalp) affects children mostly. First there appear circumscribed patches of the size of small coins with whole or partial covers of whitish grayish or yellowish scales and sometimes red papules. They may increase in number until after weeks or months the whole scalp is invaded. Itching varies in degree but is usually not severe. The hair becomes lusterless dry and brittle. Rarely is the loss of hair complete. *Trichophytosis barbae* (*tinea sycosis*, ringworm of the beard) affects the hair shafts but seldom as much as in cases of *trichophytosis capitis*. The hairs afflicted become also brittle and dry and a mild degree of itching is present. Usually there are no vesicles or pustules. The skin is slightly reddened thickened and scaly. In more severe cases probably presenting another clinical type of the disease the deeper structures are involved. The lesions consist of reddish tumors. The nodules generally become purulent. The sites of predilection are the cervicomaxillary folds and the under surface of the jaw. The upper lip is usually spared. The severe types of *tinea barbae* show very little tendency to spontaneous healing.

Actinomycosis of the skin (lumpy jaw) a chronic infectious disease is caused by a vegetable parasite described by Hirtz as the ray fungus. The infiltrated nodular lesions form subcutaneous chronic abscesses. The parasite frequently gains entrance through carious teeth or crypts of the tonsils. The sites commonly affected are the jaws face and neck. The lesions develop slowly later discharging pus and sanguineous fluid. Due to the possibility of internal complications the prognosis is severe but many of the patients with localized forms recover (Figs 32 and 33).

Blastomycosis (*saccharomycosis hominis*) also a chronic infectious disease due to a fungus the *blastomyces*, is characterized by the development of moist reddish or purplish papillomatous lesions. Usually the disease starts on exposed areas such as the face hands or ears. The lesions almost from the start are covered with crusts. The underlying lesions



Fig 32—Actinomycosis of jaw

present reddish or purplish colored papillomatous tumors. The patches usually extend peripherally. As the disease extends healing often occurs



Fig. 33—Actinomycosis of cheek showing nodular masses (Jillich)

in the center of the growth. Most of the localized cases respond to treatment fairly well. Scars usually remain, especially when larger areas are involved. Recurrences are frequently observed and in systemic cases the prognosis is grave (Fig. 34).

Occasionally patients present themselves with lesions on the face denying any knowledge of the source of the lesion, finally admitting creating them by mechanical friction. Application of a proper bandage cures them in a few days (Fig. 35).



Fig 34—Blastomycosis.

(Courtesy of Drs Oliver S Ormsby and David V Omens)

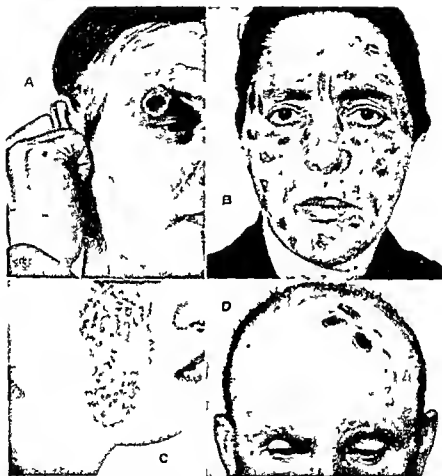


Fig. 35—Artificial lesions produced on the face by malingers. A Sharply outlined necrotic ulcer over the right eyelid. Patient denied knowledge of source of lesion which healed in a few days after the application of an antiseptic bandage. B Numerous lesions on the face. Patient at first denied knowledge of source but finally she admitted that she had created them herself by mechanical friction. Cured within a few days. C Burn on the face produced by acetic acid followed by scarring. Both sides of face. Lesions produced for malingering purposes. D Round sharply outlined penetrating necrotic wounds produced on the forehead. Self-inflicted. (From Julius Mayer: *Handbuch der Arteriosklerose*, Gustav Fischer, Jena, 1937.)



Fig 36a—Urticaria pigmentosa (xanthelasmosis) (Courtesy of Dr Lester Hollander)

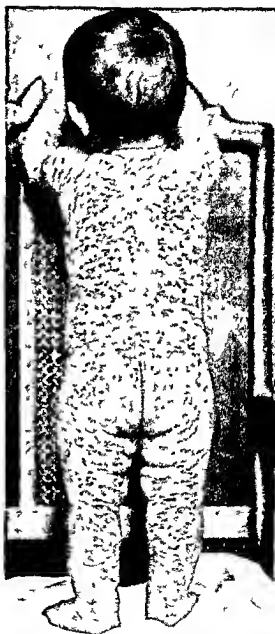


Fig 36b—Urticaria pigmentosa (xanthelasmosis) (Courtesy of Dr Lester Hollander)

Urticaria pigmentosa (xanthelasmaidea) is a cutaneous disorder of childhood marked by the occurrence of wheals succeeded by brownish yellow patches or nodules (Figs 36a and 36b)



Fig. 37.—Lymphogranuloma osseus cutis (Hodgkin's disease) (Courtesy of Drs. Oliver S. Ormsby and David V. Omens)

In Hodgkin's disease the cutaneous manifestation may be divided into two groups. The first is the nonspecific in which the lesions are not characteristic of the disease clinically or histologically. The second group is specific in which the lesions show histologic characteristics of the disease found in the glands and viscera. Prurigo and pruriginous papules and small nodules appear usually as a later manifestation. The etiology is unknown and treatment of little value (Fig. 37)

Adenoma sebaceum (*Pringle's disease*) is a congenital condition which may appear early in life or may not appear until adolescence. It is characterized by the appearance of translucent waxy papules located principally



Fig. 38—*Adenoma sebaceum* (*Pringle's disease*)
(Courtesy of Drs. Oliver S. Ormsby and David V. Omens)

over the cheeks, nose, and forehead but may appear on other parts of the body. This condition usually occurs in the mentally deficient and may occur in one or several members of a family (Fig. 38).

Lupus erythematosus is a chronic or sometimes acute disease of the skin characterized by the presence of erythematous scaling patches which induce atrophy and scar formation of the skin. Two types are described

the common or the discord variety and the diffuse or disseminated variety (Figs 39 and 40)



Fig 39—Lupus erythematosus
(Courtesy of Drs Olt et S Ormsby and David V Omens)

Lupus miliaris disseminatus faciei is a tuberculous condition of the skin occurring most frequently on the face in the form of discrete oval or roundish papules pinhead or larger in size and presenting the apple jelly brown color on diascopic pressure. These papules may be capped with small pustules or crusts. The lesions occur in crops and may undergo spontaneous involution after varying periods of time (Fig 41)



Fig. 40—Lupus erythematosus
(Courtesy of Drs Oliver S Ormsby and David V Omens)

Scrofuloderma (Fig 42) is a tuberculous process of the skin and represents a secondary involvement to underlying tuberculous processes by



Fig 41—Lupus malis disseminatus faciei
(Courtesy of Drs Oliver S Ormsby and David V Omens)

direct extension. It occurs most often in the neck over cervical lymph nodes and over joints and bones which are attacked with tuberculosis.

Hematogenous cutaneous tuberculosis (Fig 43) is a chronic disease of the skin characterized by the development of small nodules which have a predilection for the face especially the eyelids alae of the nose forehead lips mucous membranes of the nose mouth and larynx and it may rarely become generalized. Starting as pinhead size lesions these nodules gradually increase and may coalesce to form patches. These are associated with

systemic tuberculosis occurring most often in women of middle age especially of the colored races. There are no subjective sensations and the disease is chronic in its course.



Fig. 42—Scrofuloderma
(Courtesy of Drs. Oliver S. Ormsby and David V. Omens)

Keloids are firm elevations of the skin due to new growth of fibrocellular tissue in the corium. They may occur in the form of nodules, bands, or plaques, varying in size from the size of a pea to that of a plate. They may be single or multiple and they occur more often in the Negro race (Figs 44 and 45).

Granuloma pyogenicum usually develops on the site of an injury. The small, usually pedunculated tumors grow rapidly. They are vascular and bleed easily. They are of bright red color, presenting a moist or purulent



Fig. 43—Hematogenous cutaneous tuberculosis (sarcoid) (Courtesy of Drs. Oliver S. Ormsby and David V. Omens)



Fig. 44—Natural ear ring from piercing ears (keloid tendency) (Courtesy of Dr. Lester Hollander)



Fig 45a—Keloid formation.
(Courtesy of Dr Lester Hollander)



Fig 45b—Keloid formation.

surface. Sometimes they are covered with crusts. The etiology is not definitely known but traumatism followed by infection is suggested (Fig 46).

Multiple fibromata of the face may develop and remain for years without change (Fig 47) however should nodules be destroyed by ulceration



Fig 46—Granuloma pyogenicum.
(Courtesy of Drs. Oliver S. Ormsby and David V. Omens.)

epithelioma should be suspected and treatment undertaken. Superficial epithelioma occasionally occurs in patches (Fig 48). The margins may be slightly elevated and present the rolled edges seen in rodent ulcer. The nodules are variable in size and of waxy appearance. They become fissured or eroded repeatedly forming a crust which falls off each time revealing a larger and deeper ulcer (Fig 49).

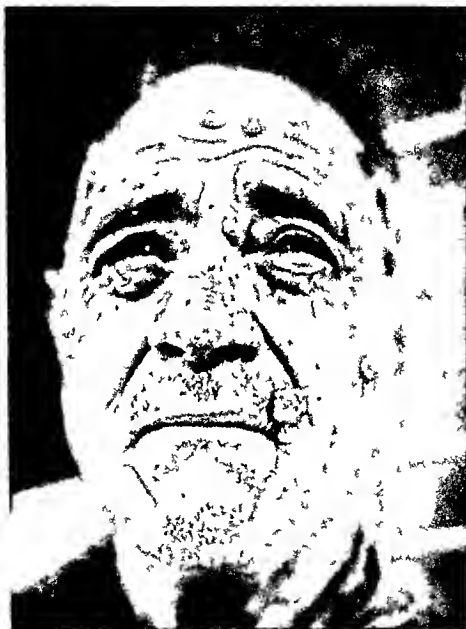


Fig. 47—Multiple fibromata of the face

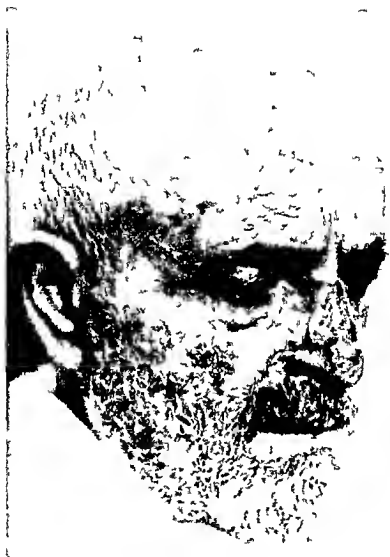


Fig. 48.—Superficial epithelioma



Fig. 49—Epithelioma (rodent ulcer).



Fig. 50—Deep seated epithelioma

The deep-seated variety of epithelioma may originate in the superficial type or develop independently. It may begin as a firm pea size nodule in or beneath the skin. Its surface is pinkish or dark red and it is often covered with dilated blood vessels. Ulceration occurs sooner or later with



Fig. 51—Congenital syphilis (Courtesy of Dr. J. H. Hess)

marked induration of its base. The floor may present papillomatous and fungoid masses. The edges may be everted, undermined, and indurated, and waxy nodules may be seen. The ulcers extend rapidly peripherally and deep, and cause marked destruction (Fig. 50). Involvement of the lymph nodes with general metastasis may follow, usually terminating in death.

Congenital syphilis is preventable (Fig. 51). The average untreated syphilitic mother has but one chance in six of bearing a living nonsyph-

ilitic infant but if syphilis is recognized before the fifth month of pregnancy and adequately treated the infant will almost always be uninfected



Fig. 52—Nodular syphilis
(Courtesy of Drs. Oliver S. Ormsby and David V. Omens)

In late syphilis individualization is required and there is no therapeutic routine suitable for all complications

Nodular syphilis may develop within the first year after infection but it is usually deferred much longer (Figs 52 and 53). The nodules are multiple, firm, of a crimson red color, beginning as macules and varying in size from that of a coffee bean to a small nut. They involve the entire thickness of the skin. The eruption may appear on one or more regions of the body such as the forehead, chin, nucha, buttocks, and thighs. These lesions are more often grouped, forming patches of a circular or horseshoe outline.



Fig. 53—Nodular syphilis
(Courtesy of Drs Oliver S Ormsby and David V Omens)

The nodules may lose their firmness and become soft assuming a lurid redness and finally ulcerating to form superimposed crusts of a greenish or blackish color. The degeneration may be rapid causing extensive destruction.



Fig. 54—Serpiginous type of syphilitic eruption
(Courtesy of Drs. Oliver S. Ormby and David V. Omens)

Nodular syphiloderma often assumes a serpiginous character and distribution and secondary changes may occur (Fig. 54).

Various combinations of nodules of syphilis with other lesions may occur which give rise to different terms expressive of the associations. Sometimes nodules are sprinkled with ulcerated points set in atrophic or scar formed tissue or they may form a ring of deep or superficial ulceration about a healing center. Even in severe types of syphilis the process in untreated cases is one of advance ulceration repair and scarring (Fig. 55).



Fig 55—Syphilis with ulcerated points set in atrophic or scar formed tissue
(Courtesy of Drs Oliver S Ormsby and David V Omens)



Fig. 56—Annular papular syphiloderma.
(Courtesy of Drs Oliver S Ormsby and David V Omens)



Fig. 57—Lenticular papular syphiloderm.
(Courtesy of Drs. Oliver S. Ormsby and David V. Omens.)

The *annular papular syphiloderm* (Fig 56) occurs most frequently in the Negro race. The eruption occurs especially on the face as well de



Fig 58—Extragenital chancre (Courtesy of Dr. Lester Hollander)

fined raised papules with involuting centers and advancing peripherally. Concentric figures may occur and by coalescence of the lesions may produce gyrated configurations.

The *lenticular papular syphiloderm* (Fig 57) may be found on all parts of the body. Lesions are seen most commonly on the face, flexor surfaces of limbs and in the inguinal region. They may be smooth and glossy or scale-covered. They are of a brownish red color. Lesions may be disseminated or grouped.

Extragenital chancre occurs most frequently on the lips, tongue, eye lids, cheeks, gingiva and female breasts. The chancres are often large, deeply ulcerating lesions accompanied by marked induration with marked regional adenopathy (Fig 58)



Fig 59—Gummatous infiltrations (syphilis)
(Courtesy of Drs Oliver S Ormsby and David V Omens)

Gummatous infiltrations are either distinctly outlined, which is the rule, or ill defined at the border, varying in extent from a coin size patch to an irregularly outlined infiltration covering an entire limb. The patch may constitute partly fused originally discrete lesions or occur as a plate of infiltration breaking down in various points. The loss of tissue may be great, the ulcers having a sloughing floor and precipitous edges (Fig 59)



Fig. 60—Jaws of the face with practically complete destruction of the nose (soft and hard parts) so that one could look through the crater into the nasopharynx. Considerable edema of the upper lip. The patient was treated at the Sakbayeme Hospital with six intravenous injections of neocarsphenamine (0.45 Gm.). The process was arrested and when seen two years later when he returned to the hospital for treatment for malaria the former crater had filled in with connective tissue leaving a small passage for respiration. Bulu tribe. (Courtesy of Dr. G. Davis Ebelowa French Cameroon West Africa.)



Fig. 61—Yaws of the face. On arrival at the hospital the patient had considerable destruction of the nose, upper and lower lips, gums and bones of the face with ankylosis of the jaw so that in eating he had to place food in the palm of his hand and force it between the small opening made by the loss of two of the upper teeth. Treatment consisted of intravenous injection of neoarsphenamine and breaking down the ankylosis. The patient left the hospital considerably improved and able to masticate his food. He did not return for check up examination. Bulu tribe (Courtesy of Dr. G. Davies Ebelowa, French Cameroon, West Africa.)

Between *yaws* and syphilis there are obvious resemblances in the tertiary stage, but there are marked differences in the primary and secondary stages. In *yaws* the primary lesion is not indurated, there is seldom distinct glandular enlargement, the mucous membrane lesions of syphilis are absent, and the most characteristic lesion, which appears in the secondary period is the *frambesial granulomatous excrescence* known as the *yaw*. The scabs in secondary *yaws* form upon the yellow heads of large papules, and beneath them are found reddish raspberry like granulations which secrete a little pus, and after a time become pale or even white. Healing usually takes place beneath the scabs which fall off about the end of the second month from the onset of the secondary rash. The raspberry like granulations, the characteristic lesion of *yaws*, will obviate confusion between these crusts and those of any other affection. *Yaws* is never hereditary or congenital. *Yaws* and syphilis confer no immunity against each other. *Yaws* may die out in a community while syphilis remains. (Figs 60 and 61)

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CHAPTER XIX

THE FACE OF DISEASED INFANTS AND CHILDREN

THE face and changing play of emotions in healthy children are of special interest. The innocent facial expressions are not yet spoiled by life as the child has not yet consciously or unconsciously developed self-control. For the physician this unconscious mirror in children's faces is of great diagnostic value. The objective symptoms of diseases in children are of much greater importance than in the adult.

The question of *hereditary influences* is of great importance. Careful investigation must be made as to the possibility of syphilis or nervous diseases. The family history, including health of both parents and brothers and sisters, should be obtained. Details as to circumstances of the child's birth are important as well as previous illnesses, nutritional disturbances, and bodily and mental development.

If the child is asleep or lying quietly, when first observed, note the general features such as color, state of nutrition, respiratory rate, and posture. If the pulse is slow, febrile disease may be eliminated. Regular, deep respiration excludes respiratory disorders.

Variations in height, weight, and bodily proportions are classified broadly as racial characteristics; in the individual they are the result of heredity, of environment, or of the glands of internal secretion. The average gain in weight of an infant is to double its weight at birth at five months and treble it at one year of age. Marked and rapid variations in weight during infancy result from loss or gain of tissue fluids rather than of flesh.

Psychic disturbances, temporary or lasting, may influence the physiognomy of children to a marked degree. A certain appearance of fearful suspicion may be observed when a child acquires the habit of lying, particularly when this becomes chronic and pathological. Depressive psychoses in children, the sequel of some diseases, may also leave their imprints on the expression of the face.

While the *skin of normal infants*, especially when breast-fed, during the first months is a healthy, glowing pink, a severe *general pallor* is a symptom of asphyxia. A pale and anemic color of the skin is often seen among twins, rachitic and premature infants. *Sepsis* and *syphilis* cause severe pallor during the first months; *von Jaksch's anemia* (*anemia pseudoleukemica infantum*), the most severe type of the ordinary anemias, occurs frequently during the latter half of the first year as well

as during the second and third year of life. It causes a yellowish discoloration of the skin. The same coloring is observed in improperly milk fed children. The pale skin of flour fed children or in those suffering from chronic nutritional disturbances shows a grayish cast.

The first degree of *asphyxia* manifests itself by *cyanosis of the newborn*. In infants dyspnea and cyanosis should suggest in addition to pneumonia the possibility of an inhaled foreign body, of laryngeal diphtheria and of congenital cardiac defects. Atelectasis, severe congenital malformation of the heart and hemorrhage of the brain may also cause cyanosis. While in normal infants during the first year the superficial veins are hardly visible emaciation causes the veins to be more prominent. In severe cases affecting young children veins may become as prominent as in adults.

Prominent veins of the scalp are often seen over the temples in syphilitic children (Fig. 1). Congestion of the brain caused by tumor, hydrocephalus and rickets is also the cause for enlarged veins of the scalp.

In about 80 per cent of all newborn infants there is a yellow non pathologic discoloration (*physiologic icterus neonatorum*). It occurs in the second or third day post partum and may last for four weeks but generally disappears after one or two weeks. The face and chest are principally affected while at the onset the sclerae remain clear.

Icterus gravis (familial) may appear in several children of one family. Meningismus with icterus of the cerebral nuclei is seldom fatal. *Icterus associated with sepsis* is seen more often in infants after birth. It may follow directly the physiologic icterus of the newborn or appear later. The child is markedly disturbed by fever, convulsions, vomiting, subcutaneous hemorrhage and loss of weight. Since sepsis is observed in the syphilitic newborn this form of icterus is relatively frequent. If icterus develops after the infant is several months old it may also be caused by sepsis and sometimes by syphilis of the liver. Icterus caused by hypertrophic cirrhosis or acute atrophy of the liver is rare in infants.

During the first few months and in early childhood *familial hemolytic jaundice* may occur. The degree of icterus is generally moderate. Sometimes diet alone is responsible for a marked degree of jaundice. A prolonged diet of egg yolk or carrots may bring on a yellow color of the skin of the nose and its surroundings. A *greenish cast of the skin* around the nose may be due to a *spinach diet*. Scurvy occurs rarely at the present time (Fig. 2).

The *scalp hair of the newborn* frequently shows an abundant growth. Its color is generally dark. The greater part of the hair usually falls out by the fourth week and the regrowing hair may be of a lighter color. Some infants show hardly any hair at birth. Abundance of hair may be a racial



Fig 1—Prominent scalp veins in a case of congenital syphilis. Protruding forehead (Feer, *Diagnosis of Children's Diseases*. J. B. Lippincott Co.)



Fig 2—Scurvy (Courtesy of Dr. J. H. Hess.)



Fig. 3—Excessive hairiness of the forehead in tuberculous child of 2 years. Heavy eyebrows (Feer, *Diagnosis of Children's Diseases*. J. B. Lippincott Co.)



Fig. 4—Alopecia of the forehead in congenital syphilis in infant of four months. Eye brows and cilia have also fallen out (Feer, *Diagnosis of Children's Diseases*. J. B. Lippincott Co.)

or familial peculiarity. Sometimes children with tuberculosis may show an excessive growth of silky hair (Fig 3) on the forehead, eyebrows, eye lashes, etc. Pyloric stenosis is also accompanied by excessive growth of hair on the forehead. In luetic children the fore part of the scalp is often bald



Fig 5—Subcutaneous emphysema over trunk and face in military tuberculosis of the lungs. Age, four years (Feet, *Diagnosis of Children's Diseases*, J. B. Lippincott Co.)



Fig 6—Angioneurotic edema. Age, seven years (Feet, *Diagnosis of Children's Diseases*, J. B. Lippincott Co.)

(Fig 4) In rickets the infants may lose part of the hair over the occiput. General alopecia of the scalp may be the result of anomaly of development and may be congenital. Alopecia areata, with completely bald areas of the scalp, sharply circumscribed (alopecia circumscripta) may leave the exposed skin slightly reddened and later become smooth and white.

Subcutaneous emphysema (Fig 5) may follow fracture of a rib or the rupture of alveolae of the lung from which the air escapes into the connective tissue of the mediastinum and from there into the subcutaneous tissue. A *hydropic constitution* with tendency to fluid retention as well as to lose it quickly is present in some children and partly pro-



Fig 7—Rickets. Dwarfism. Head 51 cms (20") instead of 49 cms (19¼")
(Feer. Diagnosis of Children's Diseases. J. B. Lippincott Co.)

vides a predisposition for edema. Kidney and heart diseases are associated with general dropsy and represent the same clinical picture in children as in adults (Fig 5). *Chronic disturbances of nutrition* often cause general idiopathic edema of infants. Severe forms of urticaria may be surrounded by areas of edema especially in the face as *angioneurotic edema* (Quincke's disease) (Fig 6). Angioneurotic edema of the lips

face and tongue usually appear in infancy on the addition of new foods. Spectacular urticarial swelling of the lips and tongue, which may spread to the whole face, occurs immediately on ingestion of the offending food. Violent vomiting and colic and often severe bronchial asthma and hay fever may accompany such attacks. Milder reactions consist of a perioral erythema, sneezing, mild wheezing and colic with more or less generalized urticaria. Serum disease may be followed by general edema which

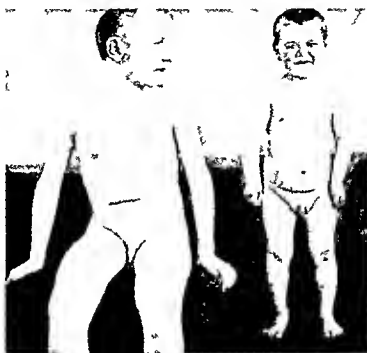


Fig 8—Dwarf with normal boy of same age 13 years. Head 43 ± 5 cm (17")
(Feer: *Diagnosis of Children's Diseases*. J. B. Lippincott Co.)

is especially pronounced on the eyelids. When the edema is severe it may increase the circumference of the head to a marked degree. Pertussis and sometimes mediastinal tumors or enlarged bronchial lymph nodes may be associated with edema of the face affecting the eyelids especially.

The size of the head in proportion to the body is relatively large in normal infants. The ratio of the length of the head to that of the body is 1.4 in infants while it is 1.8 in adults. Advanced cases of rickets frequently show considerable enlargement of the head. A thickening of the skull pronounced mostly over the frontal prominences is observed in rickets (Figs 7 and 8). Enlargement of the head with saddle nose is found in *chondrodystrophy*. True *dwarfism* with *hypogenital* and *hypothyroid* etiology usually shows a relatively large head.

In *chronic hydrocephalus* (Fig 11) the child's skull is extremely enlarged. In *chronic internal hydrocephalus* the abnormal circumference of the head may amount to 25 or 28 inches. While the skull is grotesquely enlarged, the face appears relatively small and the eyes are protruding. The head of infants born prematurely may become enlarged to a certain



Fig 9—Chronic internal hydrocephalus. Note superficially dilated veins and exposed upper sclera (Courtesy of Dr J H Hess)

degree, but this condition usually disappears in contrast to chronic internal hydrocephalus which does not disappear in prematurely born infants (Fig 12).

A frequent cause of chronic hydrocephalus in infants is syphilis. Hydrocephalus may be present at birth or appear during the first months. A characteristic symptom is prominence and a downward direction of the eyes. Other symptoms are twitchings and increased reflexes, spasms, and



Fig 10—Moderate mental debility. High forehead due to megacephalus (no rickets). Was a premature infant. Picture at two years of age. (Feer. *Diagnosis of Children's Diseases*. J. B. Lippincott Co.)



Fig 11—Hydrocephalus following cerebrospinal meningitis. Head 46 cm (18"). (Feer. *Diagnosis of Children's Diseases*. J. B. Lippincott Co.)



Fig. 12—Caput natiforme syphilitic (Feer "Diagnosis of Children's Diseases" J. B. Lippincott Co.)



Fig. 13—Late syphilis. Radial scars about the mouth. (Feer "Diagnosis of Children's Diseases" J. B. Lippincott Co.)

tremors. Optic atrophy may develop. In older children, brain tumors, especially of the posterior fossa, may cause these symptoms.

Among other causes of hydrocephalus may be *cerebrospinal meningitis* (Fig. 11), brain tumors, solitary tubercle, and serous meningitis. Hydrocephalus due to *internal hemorrhagic pachymeningitis* rarely becomes as large as hydrocephalus of the internal type, it enlarges gradually and assumes globular shape.



Fig 14—Oxycephalus (Courtesy of Dr J H Hess.)

Congenital malformations and congenital or birth injuries may be responsible for *microcephaly*. Here the forehead is often low and receding. It causes mental defects, and the children become idiots and imbeciles.

Marked *bulging of the forehead* and pronounced frontal bosses with a flat top are characteristic of the *natiform head* (Fig. 12). It is evident by the end of the first year of life. Rickets may be among the etiologic factors. The natiform head of congenital syphilis is noticeable earlier, usually

during the first months of life (Fig 12). Here the edges of the fontanel are hard. A pronounced protrusion of the frontal prominence is especially noticeable on palpation in late congenital syphilis (Fig 13). A high pointed skull or *oxycephalus* (Fig 14) with an unusually high receding forehead is followed later by the development of disturbances of vision, exophthalmos and choked disc. A flattened occiput as the result of prone positions is encountered in rachitic children with *caput quadratum* and a typical sad expression of the face.



Fig. 15—Flat occiput. N. S. Chitts. (Feer "Diagnosis of Children's Diseases," J. B. Lippincott Co.)

In cases of *chronic dehydration* atrophy, chronic nutritional disturbances and after severe illnesses a depression of the fontanel develops (Fig 16). In cases of severe dehydration in younger children the cranial bones may overlap at the sutures; the edges of the parietal bones overlap the edges of the occipital and frontal bones (Fig 17).

Little's disease (*spastic cerebral dislegia of infancy*) is sometimes caused by intrauterine damage or birth trauma but occurs more often after birth. The hemiplegic forms may follow thrombosis or syphilis (Fig 18), hemorrhage, encephalitis or embolism. Later epileptic convulsions and idiocy develop frequently. The para and diplegic forms follow an intrauterine defect of the brain often resulting in microcephaly. Sometimes these follow chronic hydrocephalus. Prematurity or difficult labor may also be causes.

Of the internal disorders of the eyes *cataract* is often seen at birth or shortly afterwards; the most frequent form of cataract is the *anterior polar*

cataract The center of the lens is clouded by a distinctly circumscribed round opacity Rickets tetany and disturbances of development may cause *lamellar cataract*, certain layers between the nucleus of the lens and cortex are clouded while the peripheral regions are not affected and remain



Fig 16—Sunken fontanel Colon pyelitis with sepsis. (Feet Diagnosis of Children's Diseases J B Lippincott Co)



Fig 17—Overlapping of the parietal bones over the frontal bones due to insufficient fluid intake (Feet Diagnosis of Children's Diseases J B Lippincott Co)

clear The edges are usually more affected by the clouding than the center *Atrophy of the optic nerve*, nystagmus and strabismus often follow *familial amaurotic idiocy*, where a bright red spot is found at the center of the macula lutea

Exceptionally glaring bright eyes slightly protruding during the first months are observed with *congenital syphilis* (Fig 19) In *orthostatic*

proteinuria or *vagotonia*, on the other hand the eyes are deep set and surrounded by dark rings. This is seen in older children. During the first few weeks of the infant's life strabismus is not pathologic. *Spasmophilia* may be associated with *spastic strabismus*. In brain tumor and tuberculous meningitis strabismus is seen. General asthenia after illnesses *e g*, after severe infectious diseases may result in periodic strabismus.



Fig 18—Child seven years of age. Severe case of Little's disease. Macrocephaly strabismus.
(Feer. *Diagnosis of Children's Diseases*. J. B. Lippincott Co.)

Diphtheritic paralysis produces a peculiar facial expression. The paralysis of the soft palate is associated with a moderate paralytic convergent strabismus and often a general flaccidity of the entire facial musculature. While easily overlooked the physiognomy is typical (Fig 20). Bilateral paralysis of the accommodation is often caused by diphtheria. *Congenital paralytic strabismus* is due to developmental mischief in the brain.



Fig. 20—Child of four years with diphtheritic paralysis of the triangulatis oris and of the abducens. Flaccidity of the entire face (Feer, "Diagnosis of Children's Diseases," J. B. Lippincott Co.)



Fig. 21—Fixed state of blindness (Feer, "Diagnosis of Children's Diseases," J. B. Lippincott Co.)



Fig. 22—Seventeen month old child with syphilitic saddle nose (Feer Diagnosis of Children's Diseases J. B. Lippincott Co.)



Fig. 23—Mongolism in Negro child two months old (Courtesy of Dr. Roland H. Scott.)

of the nose is manifest in different shapes. It sometimes develops in non-syphilitic cases. Cretinism, myxedema, and chondrodystrophy are associated with a marked depression of the nasal bridge.

Nose bleeding often occurs in syphilis, diphtheria, la grippe, sepsis, and other diseases. Other causes for epistaxis may be heart lesions, congestions in pertussis, thrombosis of the longitudinal sinuses, and nephritis. Some



Fig. 24—Child three years old. Mongoloid idiocy. Marked epicanthus. Slanting lid apertures not very marked. (Feer, *Diagnosis of Children's Diseases*. J. B. Lippincott Co.)

disturbances of the blood (leukemia, anemia) may cause nose bleeding. Epistaxis, the result of purpura hemorrhagica, sepsis, hemorrhagic diathesis and hemophilia, may prove dangerous because of the difficulty in controlling the bleeding.

Slanting lid apertures are seen in mongoloid idiocy (Fig. 23), in which the face presents, with epicanthus, a typical picture (Fig. 24). Mongolism and myxedema are accompanied by marked epicanthus. Sometimes epicanthus is observed in normal children also. *Klumpke's paralysis* (atrophy and paralysis of the muscles of the forearm and hand), due to a lesion of the seventh and eighth cervical and first dorsal nerve roots, shows sensory and oculopupillary disturbances and unilateral narrowing of the aperture of the lid miosis. This is seen in young children.



Fig. 25—Twelve month-old infant. Myxedema. Large mouth and tongue.
(Feer. Diagnosis of Children's Diseases. J. B. Lippincott Co.)



Fig. 26—Cretin with large goiter. (Feer. Diagnosis of Children's Diseases.
J. B. Lippincott Co.)

A persistently open mouth in infants points to idiocy. In older children the open mouth may be due to restriction of the nasopharyngeal space, as by enlarged adenoids. Other causes may be deformity of the jaw bones as seen in rachitic children, which in turn causes malposition of the teeth, another cause for a persistently open mouth. In myxedema (Fig. 25) the tongue is frequently extremely large and protruding. The mongolian idiot also has an enlarged tongue, differing from the tongue of myxedema in that the latter is longer and more pointed. In mongolism a flattening of



Fig. 27—Lymphangioma colli cysticum. New-born infant. (Feer, "Diagnosis of Children's Diseases," J. B. Lippincott Co.)

the back of the head is frequently observed. An unusually wide oral orifice is a symptom of myxedema. The lips may be thick and coarse.

Enlargement of the thyroid gland, or goiter, is frequently seen in cretins. In older cretinous children the goiter may reach a large size (Fig. 26). A rapid growth of lateral swellings of the neck affecting the face may be observed in *lymphangioma colli congenitum* (Fig. 27). There are also instances of congenital goiter (Fig. 28).

Maculopapular syphilid of the newborn, so called *syphilitic roseola of the newborn*, shows desquamation in the regions of the lesion (Fig. 29). In *diffuse syphilid of infants* the face is discolored slight tan. The erythematous skin may desquamate or develop erosions. *Infantile syphilis*



Fig 28—Congenital goiter (Courtesy of Dr J H Hess)



Fig 29—Maculopapular syphilid (Feer Diagnosis of Children's Diseases
I B Lippincott Co)

and *desquamative erythroderma* are often associated with seborrheic crusts on the eyebrows.

Congenital syphilis may be accompanied by *plastic iritis*; however, it occurs very seldom. *Rhagades around the lips*, during the first months



Fig. 30—Congenital syphilis with rhagades about the mouth and nares (Andrew's Diseases of the Skin, W. B. Saunders Co.)



Fig. 31—Face of a four month-old child. Severe alimentary intoxication. Two days before death. Unconsciousness with jeritation. Corneal reflex has disappeared. (Farr, "Diagnosis of Children's Diseases," J. B. Lippincott Co.)

of the infant's life, are characteristic of congenital syphilis (Fig. 30). Rhagades at the canthus also points to congenital syphilis. *Syphilis of the optic nerve and the retina* or a pigmentary degeneration of the retina, cataract, and hydrophthalmos congenitalis may often cause congenital blindness. The cause for *acquired blindness* is usually *ophthalmia*

neonatorum, although scrofulous eye diseases, late syphilis, trachoma and smallpox may also be responsible, oxycephaly, meningitis, and tumors may also be the cause if the media are clear and transparent. *Amaurotic idiocy* may cause blindness during the first year.

Syphilitic gummata are often followed by deep ulcers. They may be covered by purulent grayish crusts.

Toxic conditions, such as *severe toxicosis* or alimentary intoxications, are frequently associated with a disturbance of consciousness during the first months after birth (Fig 31). Alimentary intoxication is in its early stage often accompanied by a pronounced lack of interest, the play of the facial muscles becomes tired and slow. "Fencer's position" is a frequent accompanying symptom (Fig 32).



Fig 32—Four month-old child with moderate alimentary intoxication. "Fencer's position" somnolence, fixed stare (Feer, *Diagnosis of Children's Diseases*, J B Lippincott Co)

Severe infections such as sepsis or tuberculous meningitis may also cause a disturbance of consciousness. Characteristic symptoms in cases of *tuberculous meningitis* or in typical cases of epidemic encephalitis may be a fixed stare, strabismus, tense or bulging fontanels, or paralysis of various eye muscles or of the facial nerve (Fig 33).

Otitis and sepsis are often followed by *lateral venous sinus thrombosis*. Thrombosis of the longitudinal sinus in the infant results in tonic convulsions of the ocular muscles with fixation.

Acute infectious diseases may be followed by *encephalitis* resulting in *spastic cerebral hemiplegia*. Traumatism, purulent disease of the middle ear, or inflammation in other parts of the body, such as the lungs, may cause *brain abscesses*. A frequent cause of brain abscess in the newborn is sepsis. Contracture and trismus, asphyxia and convulsions, as well as

paralysis of the facial nerve may be among the symptoms. Somnolence or delirium appears at the onset of *epidemic encephalitis*. Characteristic symptoms are ptosis, strabismus, and paralysis of the oculomotor and of the abducens nerves. Inequality of the pupils, paralysis of the facial nerve and lack of facial expression may also be present. Parkinson's mask or the immobile facies of *paralysis agitans* is very common.

Paralysis and contractures of the facial muscles cause the face to change in a characteristic manner (Fig. 34). *Tetanus neonatorum* (Fig. 35) presents peculiar tonic contractures of the whole face, starting with lockjaw. There is also wrinkling of the forehead. A *unilateral paralysis of the face*



Fig. 33—Eleven month-old child. Tuberculous meningitis, fixed stare, strabismus and coma. (Feet: *Diagnosis of Children's Diseases*, J. B. Lippincott Co.)

is caused mostly by birth trauma and usually disappears soon. *Complete peripheral paralysis of the face* is caused often by caries of the petrous portion of the temporal bone (Fig. 36). *Epidemic infantile paralysis* may sometimes be responsible for facial palsies. Infantile paralysis affecting the abdominal muscles or diaphragm may produce characteristic respiratory difficulties.

Between the age of six months and three years *tasting or nodding spasms* of the head may be noted, especially when the child is awake and lying down. When the child closes its eyes or falls asleep the movements cease. Such involuntary movements occur especially in imbecilic, neuro-pathic and rachitic children. Chorea movements are principally seen in chorea minor; they seldom occur before the sixth year. Exaggerated facial emotional expressions are a characteristic symptom. The disease develops slowly and gradually. After the fourth to the seventh year spasmodic tic occurs and may persist for several years. The muscles of the face and the shoulders are mainly affected. Blinking or twisting of the mouth is characteristic. *Pathologic tremor* is observed in various affections of the central nervous system, especially meningitis, diseases of the cerebellum, brain



Fig. 34—Eleven month-old child. Carpopedal spasm with edema of the feet and fish mouth (Feer. *Diagnosis of Children's Diseases*. J. B. Lippincott Co.)



Fig. 35—Tetanus neonatorum. The picture is taken during a convulsion (Feer. *Diagnosis of Children's Diseases*. J. B. Lippincott Co.)



Fig. 36—Four week-old child. Complete peripheral paralysis of the facial nerve due to a middle ear infection (Feer. *Diagnosis of Children's Diseases*, J. B. Lippincott Co.)

tumor solitary tubercle and chronic hydrocephalus. It occurs also in syphilis of the spine, epidemic encephalitis and toxic neuritis. In the so-called *polyneuritic form of epidemic infantile paralysis*, paralysis of the facial nerve may sometimes be the only symptom. The pontine and bulbar forms attack the facial nerve and shoulders as well as the ocular muscles.



Fig. 37—One year-old child with pseudobulbar paralysis. (Feer "Diagnosis of Children's Diseases," J. B. Lippincott Co.)

Congenital absence of the nucleus is responsible for the so-called *infantile nuclear atrophy* which occurs shortly after birth. The upper nucleus for the facial nerve is most frequently affected. It causes ptosis and other paralyzes of the parts supplied by the nerve. The paralysis which is mostly bilateral may be responsible for complete external ophthalmoplegia.

Ptosis is common in epidemic encephalitis. It is generally accompanied by disturbances of innervation of the ocular muscles, tendency to stupor and delirium. Sometimes it is acquired as in meningitis, especially

in tuberculous meningitis and cerebral syphilis. Frequently it may be bilateral or unilateral. *Congenital and persisting ptosis* may be caused by a faulty development of the brain. The skin of the forehead may be



Fig. 38—Two and one half year old child with brain tumor. Stupor, strabismus.
(Feer. *Diagnosis of Children's Diseases*. J. B. Lippincott Co.)



Fig. 39—Congenital torticollis (muscular). Left side of face larger than right.
(Feer. *Diagnosis of Children's Diseases*. J. B. Lippincott Co.)

thrown into transverse folds due to the action of the occipitofrontalis muscle.

True bulbar paralysis is a rare disease. It makes it impossible for the patient to swallow, to move his tongue, or to pucker up his lips. *Pseudo*

bulbar paralysis is more frequent. It may occur as a form of congenital cerebral palsy of infants (Fig. 37).

Serous meningitis may be accompanied by somnolence, vomiting, convulsions, and strabismus. It may follow bronchopneumonia, otitis, nutritional disturbances, epidemic encephalitis, or pertussis. Chronic hydrocephalus may be a sequence. Vomiting, crying, and convulsions are symptoms of meningitis. Meningitis, though rarely, may complicate epidemic parotitis at the beginning or during the first ten days, and may result in paralysis of the facial and oculomotor nerves.



Fig. 40—Scrofulous facies. Blepharospasm. (From "Diagnosis of Children's Diseases," J. B. Lippincott Co.)

Increased reflexes and spasms as well as tenseness of the fontanel are symptoms of *internal hemorrhagic pachymeningitis*. Children with anemia are especially liable. The patients become more and more excited; the eyes are wide open. It results usually in recovery, although it may be followed by hydrocephalus. It occurs in infants only.

Tumors of the brain are usually observed in children over two years of age. A fixed stare, stupor, and choked disc (papillitis) are characteristic. Often a peculiar expression of the face is observed, resulting from a pronounced reduction of the movements of the muscles of the face. Stupor and strabismus are also present. (See Fig. 38).

Severe anhydremia after disturbances of nutrition may cause a hydrocephaloid condition in infants. The clinical picture resembles the picture of meningitis. It shows inequality of the pupils, convulsions, and loss of consciousness.

Torticollis, or contraction of cervical muscles with bending of the head, which is caused by a birth hematoma of the sternocleidomastoid muscle in most of the cases, occurs during the first weeks after birth. Atrophy of the inclined side of the face may follow (Fig 39). Infectious processes, spondylitis, and rheumatism may be responsible for wry neck in other children.

Tuberculous meningitis presents a clinical picture of many and varying symptoms which contribute to diagnostic difficulties. The child be-



Fig 41—Child three and one half years old. Scrofula. Thick upper lip. Blepharospasm. (Feer, *Diagnosis of Children's Diseases*. J B Lippincott Co.)

comes irritable and apathetic. Motor irritability of the facial muscles becomes apparent. Other symptoms are basal irritation, somnolence, convulsions, facial paralysis, dilatation of the pupils and ptosis. Exceptionally long eyelashes are often seen in tuberculous patients.

Blepharitis is often associated with scrofula. *Blepharospasm* may be a symptom of general nervousness or due to vesicles with serous contents (*phlyctenulae*) and ulcers resulting therefrom (Fig 40). In the *scrofulous facies*, the upper lip protrudes and the alae nasae are thickened and often eroded by rhagades and eczema (Figs 41 and 42). Especially significant, even pathognomonic, is the severe, often unilateral conjunctivitis with pericorneal injection or varying degree of phlyctenular thickening of the lids and photophobia. This easily recognizable picture indicates the presence of tuberculosis.

Causes for delayed dentition are mainly rickets, disturbances of nutrition, myxedema, mongolian idiocy, and cretinism. In rickets there is often not enough room for the teeth in the narrowed jaw, and therefore the teeth,



Fig. 42—Scrofula.



Fig. 43—Syphilitic girl of nine years. The state preceding true Hutchinson's teeth. (Feer, "Diagnosis of Children's Diseases," J. B. Lippincott Co.)

especially the upper teeth are bowed out or appear in a V shaped formation. Unusually small teeth are seen in rickets and in congenital syphilis the latter may cause the entire lack of some incisors. Deformities of the teeth are also seen in late syphilis. Hutchinson's teeth, peg shaped incisor teeth noted at the cutting edge, are often seen in congenital syphilis they are characteristic of late syphilis (Fig 43) although semilunar



Fig 44—Facies in congenital syphilis (Courtesy of Dr. Lester Hollander)

erosions of the edges without tapering may be seen in nonsyphilitic children. Syphilis is also responsible for other abnormalities of dentition (atrophy and crumbling of the first four permanent molars). It causes exposure of the dentin, the chewing surface becomes worn down and the center carious. Other malformations due to hereditary syphilis are besides unusually small teeth, deep horizontal erosions, pointed cusps, etc. (Fig 44).

Abnormal early caries of the temporary teeth may be caused by a diet lacking in mineral salts. Rickets is also responsible for enamel defects of the neck of the teeth followed later by circular caries. In older children rickets causes linear enamel defects of the incisors after the enamel is discolored to greenish brown.

The age incidence of disease will give certain aid to diagnosis especially true in regard to various communicable diseases of childhood. *Scarlet fever* is so uncommon during the early months of life that the diagnosis of



Fig. 45.—Hemorrhage of the conjunctiva and upper lid of the right eye due to congestion in pertussis. The left eye shows edema. The small sores on the forehead and over the nose are scabs of chicken pox. (Feer: *Diagnosis of Children's Diseases*. J. B. Lippincott Co.)

erythema neonatorum is more probable than one of scarlet fever. *Measles* is very common. *Chickenpox* is rarely encountered during the first three months but *smallpox* frequently affects the newborn. *Whooping cough* (Fig. 45) and *diphtheria* are both common during the first months, the latter frequently appearing in the nose while the throat remains free.

In regard to infection and contagion the entire skin area and the interior of the mouth should be examined for rash, the ears and nose for any discharge, the fauces and umbilicus for diphtheritic deposits, the vulva and eyes for gonorrhea, and the hair and scalp for parasites of various kinds.

Diseases such as measles, grippe, scarlet fever, and smallpox may cause catarrhal conjunctivitis. Severe *purulent conjunctivitis* in the newborn is often caused by gonorrheal infection. Diphtheria is almost always responsible for conjunctivitis with membrane formation. Pertussis may bring on hemorrhage of the conjunctiva and swelling of the lid. Fracture of the base of the skull may also cause hemorrhage into the eyelids (Fig. 46).

Simple coryza, catarrhal inflammation of the nose, caused by catarrhal infections, is seen frequently. It is a prodromal symptom of measles and very frequently grippe, but is usually absent in typhoid fever. Syphilitic coryza, with a characteristic snuffle, occurs during the first weeks of life. Often ulcers and rhagades appear around the nostrils and the head is often rotated. In untreated cases it is soon followed by ulceration of the septum and periostitis of the nasal bones.



Fig. 46—Six year-old child. Fracture at the base of the skull. Hematoma of both eyelids. Coma lasting for days. (Feer, *Diagnosis of Children's Diseases*, J. B. Lippincott Co.)

Rhinitis of scrofula, resembling diphtheritic rhinitis, is characterized by a sanguinopurulent nasal discharge with infiltration and erosion of the nostrils without the formation of a membrane. In *diphtheritic rhinitis*, the submaxillary lymph nodes are enlarged, and a membrane commonly forms over the vomer and middle turbinate bone. Rhinitis is one of the characteristic signs in the syphilitic newborn. Scarlet fever also may be accompanied by rhinitis with a purulent nasal discharge. In *sepsis* also a bloody purulent discharge may be encountered. *Erosive rhinitis* is often accompanied by a thickened upper lip. On the lips of the newborn small rectangular lines may be found, and the epidermis may appear grayish; this is of no pathologic significance.

The so-called *raspberry* or *strawberry tongue* is characterized by swelling of the papillae and a bright red color. It is seen during the first week of the course of *scarlet fever*. Sometimes other diseases such as *measles* etc. may display a similarly colored tongue with swellings. A rare appearance of the tongue is *geographic tongue*, with irregular areas of denudation (Fig. 47).

In diseases characterized by fever *circumoral pallor* (an area of whiteness around the mouth) may be seen in most patients but is especially



Fig. 47—Geographic tongue. Boy of eight years. (Feet. Diagnosis of Children's Diseases. J. B. Lippincott Co.)

prominent in *scarlet fever*. A suggestive facies with coryza and conjunctival injection may suggest *measles* before the rash appears.

Measles (rubeola) is an exanthematous contagious disease of children characterized by the appearance of small red follicular lesions; later in increasing in size and number they are not distinctly circumscribed. First the forehead or the skin behind the ears becomes afflicted; within two days the lesions spread over the whole body. A narrow pallid region is often seen around the recently developed eruptions. The color of the eruptions in *measles* is more on the purple side while the rash of *scarlet*

fever is more carmine in color. The lesions become paler after a few days and a brownish pigmentation replaces the efflorescence remaining some times for weeks.

In *rubella* (*German measles*) the size of the eruptions is between the sizes of the efflorescences of measles and scarlatina the latter being smaller. Here the eruptions are not irregular as in measles but are of equal size round or oval shaped and less raised. The color is lighter than in measles and the eruptions are more widely separated than in scarlatina. Spreading of the eruption which makes its appearance at the head is more rapid than in measles the whole body is sometimes covered in about half a day. The cheeks are especially reddened by a dense efflorescence. Sometimes conjunctivitis is present however the photophobia is not so pronounced as in true measles. No pigmentation is left when the eruptions disappear.

Megalerythema (*infectious erythema*) also affects the face first. Small red spots appear. The disease is less frequent than measles sometimes it is epidemic. Later the small spots become markedly elevated lesions developing quickly.

Roseolar eruptions are sometimes associated with infectious diseases such as meningitis, military tuberculosis, sepsis and grippe but especially with *typhus* and *paratyphus*. The *rose spots of typhoid fever* are caused by metastases of the typhoid organism with swelling of the papillae of the skin. The rash appears on the fourth or fifth day and spreads rapidly. After a few days the rose colored spots become bluish red. It is an interesting etiologic fact that the same cause may be responsible for different erythemata.

At the height of a well marked case of typhoid fever the facies is characteristic. The expression and the mentality are dull and apathetic and the patient is indifferent to his surroundings. He may be in a quiet muttering delirium. The tongue is apt to be dry and the teeth covered with brownish sordes. However this facies may be seen not only in typhoid fever but in all diseases which are characterized by a typhoid state. *General sepsis* may cause eruptions not unlike those of measles and scarlet fever or it may produce an urticarial or rubellalike rash.

The efflorescence of serum disease may also be scarlatiniform, measles like or urticarial. A given patient may develop different forms of eruption. The appearance of the rash between the fifth and the fourteenth day is of diagnostic value. Sometimes exanthemata following serum reactions may be accompanied by edema, cyanosis, collapse or dyspnea.

Dyspeptic erythema appears in infants with dyspepsia or grippe especially in infants less than six months of age. The eruptions may resemble

measles or rubella, but they are seldom like the rash of scarlet fever. They disappear soon.

Large erythemata are frequently due to vaccinia, meningitis, erysipelas, cholera, and tuberculosis. Sometimes eruptions like those of scarlet fever and measles, or purpuriform eruptions appear as a prodrome of exanthemata. The prodromal rash in chickenpox, for instance, resembles scarlatinal eruptions.

Erythema multiforme is relatively rare in young children. The most frequent type is manifest by elevated red spots of different dimensions (from the size of a pea to a dime). The centers at first become sunken and cyanotic and later assume a papular or urticarial appearance. Some



Fig. 48—Molluscum contagiosum. Age, one and one-half years. (Feer, *Diagnosis of Children's Diseases*, J. B. Lippincott Co.)

times the eruptions appear on the forehead but more frequently on other parts of the body. Toxic erythema of the newborn is seen rather frequently.

Urticaria (nettle rash) is an ephemeral skin eruption accompanied by itching; it appears and may disappear suddenly. The eruptions may be large or small, elevated, and either of a bright red color or, at times, of a pale hue. They are often associated with edema, particularly of the eyelids. Urticaria often follows digestive disturbances or scabies, sometimes it is caused by insect bites. Hemorrhagic urticaria may be followed by pigmentation. Papular urticaria is seen relatively often in young children (*strophulus infantum* or *lichen urticatus*). At the center of the

urticarial wheal is an elevated papule. The eruptions are small, varying in size from the head of a pin to the size of a pea; however, the face is seldom afflicted. *Erythoderma desquamativum* (Leiner) is characterized by dry seborrhea of the forehead and scalp covered with waxy yellowish crusts.

In *smallpox* (*variola*) the papules are red at first, raised and particularly dense on the face. The smallpox eruptions appear after the third or fourth day of the disease, starting on the face. The papular eruptions are followed by vesicles and pustules and the production of pits.



Fig. 49—Eight year-old girl with herpes labialis (Feer, "Diagnosis of Children's Diseases," J. B. Lippincott Co.)

Young unvaccinated children may develop eruptions on the face similar to the red swellings of erysipelas.

Chickenpox (*varicella*) is an infectious eruptive disease especially of childhood. The face and back of the hand are the main locations of the lesions. They consist of slightly elevated papules of a yellowish brown color, of oval or round shape (Fig. 45).

Molluscum contagiosum (*molluscum epitheliale*) is a skin disease with hard, round nodules containing semiliquid material, appearing in children, especially on the face. The papules vary in size from that of a pin-head to that of a pea. They have a shining transparency like a pearl and are white or pink in color (Fig. 48).



Fig. 50—Child two years old with impetigo contagiosa. (Feer's Diagnosis of Children's Diseases, J. B. Lippincott Co.)



Fig. 51—Child one and one half years old with crusted bleeding eczema of the head. Eyelids are not affected. (Feer's Diagnosis of Children's Diseases, J. B. Lippincott Co.)

Hydron vacciniiforme makes its appearance on exposed surfaces, such as the face and hands only. The raised papules have red bases. The papules become quickly covered with pearl-like crusts. Often scars remain after the disappearance of the papules similar to the scars after smallpox. It is a rare form of eruption.

Granulosis rubra nasi consists of dark red, fine nodules appearing on the red tip of the nose of marasmic infants.



Fig 52—*Lupus vulgaris incipiens*. Boy, aged 12. Since he was two, when his father died of tuberculosis, he has had lesion on right cheek which began as a tubercle following injury. Similar lesions appeared near original. Illustration shows dime sized group of superficial, soft, brownish red tubercles. Cultures from inoculated guinea pig gave characteristic growth of human type of tubercle bacillus (Abt's Pediatrics, W. B. Saunders Co., Phila.)

Newborn infants may show elevated spots, red or bluish red, the size of a dollar on the cheeks as well as on other parts. They are similar to erythema nodosum. Necrosis of the subcutaneous adipose tissue following birth trauma is supposed to be the cause (Bernheim). After healing there are no scars left.

Herpes labialis presents groups of vesicles with a red base, generally around the mouth (Fig 49). Herpes is seldom found before the third or fourth year. It appears in herpetic fever, la grippe, cerebrospinal meningitis, and lobar pneumonia. In older children it is observed in cases of diphtheria and paratyphoid.

A diffuse erysipelas-like erythema around the mouth is characteristic of *dermatitis exfoliativa*. It appears during the first days or weeks after birth and may, in severe instances, spread over the whole body within a few days. The epidermis is swollen, the corium largely exposed, and it later

shows a brownish red coloring. The affected parts of the epidermis are easily pushed away, exposing the bright red papillary layers. The afflicted areas are covered with crusts, exudations, fissures, and rhagades around the mouth and joints.

Impetigo contagiosa is very frequently encountered in early childhood and appears around the mouth and on other parts of the face (Fig. 50).



Fig. 53—Mumps

The purulent eruptions become dry and leave behind honey-colored crusts. No scars are left after they disappear. Frequently the eruptions are preceded by slight eczematoid lesions of the skin. Streptococci are largely responsible.

Eczema is an inflammation of the skin with exudation of lymph and may be the result of different irritations. The so-called *lymphatic diathesis* is said to be a predisposing factor. Associated with itching it is chronic and tends to recur. A variety of pathologic afflictions of the epidermis and

corium result. Pronounced hyperemia and edema may occur in marked acute exacerbations, particularly of the face, and produce a resemblance to erysipelas. Seborrhea of the scalp and chapping of the cheeks in infants may be followed by eczema. *Eczema madidans* and *crustosum* affects the



Fig. 54—Beginning noma in a healthy four year-old boy. It arises from a carious tooth (Feer, *Diagnosis of Children's Diseases*, J. B. Lippincott Co.)



Fig. 55—Noma

scalp and the face, especially of overnourished infants (Fig. 51). The disseminated form is seen in emaciated infants and is characterized by a greater tendency to become chronic and to have drier proclivities.

Lupus exulcerans is a common skin disease occurring during school age. It usually affects the face. Miliary lupus nodules appear around the ulcer. In *lupus vulgaris* or typical lupus reddish brown or brownish yellow

nodules appear. They are of pinhead size and have a desquamated crusted or ulcerated covering (Fig. 52).

Trichophytosis is a contagious disease of the skin and hair due to the invasion of trichophyton. It seldom occurs after puberty. Stumps of grayish or black hair protrude from small desquamating foci in the noninflammatory type of trichophytosis. The inflammatory type of the disease shows purulent follicular lesions over the scalp. Sometimes an exanthem may also be present with eruptions resembling those of scarlet fever.

Mumps (idiopathic parotitis) is an infectious disease marked by swelling of the parotid gland, and is generally manifest by indistinct margins over the articulation of the lower jaw (Fig. 53). The incubation period lasts from two and a half to three weeks.

Broken down lymph nodes *scrofuloderma* or bone foci may give rise in tuberculous children to superficial ulcers.

Noma or *ulcerative stomatitis* may be highly disfiguring (Figs. 54 and 55).

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Fig. 1.—Hemiplegia shown in an ancient bust of a man with facial paralysis of central origin. The facial characteristics show a keen sense of observation by the sculptor. Discovered about 1900 in the environs of Saint Thomas Church. Attributed to Nicolas Gerhaert of Leyden, one of the noted sculptors of the fifteenth century (Dr G. Raillieb of Reims in *Aesculape*).

'central paralysis' characterized by *lower facial weakness*. The upper portion of the face is spared because of the bilateral cortical innervation already described. The patient therefore is able to close his eye on the affected side. When the adjacent areas of the cortex are concomitantly involved



Fig 2—Right hemiplegia with lower facial palsy. Conjunctivitis of the left eye and drooling from left angle of the mouth

a homolateral weakness of the arm and leg is also noted as this is generally a part of *hemiplegia* (Figs 1 2 3 and 4)

Nuclear lesions result when the nucleus in the pons is directly involved. *Weakness of the entire face* occurs with no disturbance of taste or hearing. *Abducens or sixth nerve involvement* may also take place where the facial

nerve hooks around its nucleus producing a paralysis of the *external rectus muscle*

In the motor root between the emergence from the pons and the geniculate ganglion in the upper part of the facial canal, lesions will result in a



Fig 3—Hypertensive heart disease and facial palsy. Left hemiplegia with lower left facial palsy

complete homolateral paralysis of the face and partial deafness due to involvement of the acoustic nerve. However no taste disturbance occurs

In *facial nerve lesions* a complete facial paralysis results with taste disturbance of the anterior two thirds of the tongue. Secretion of the salivary and tear glands is also disturbed and hyperacusis is also noted



Fig. 4—Hypertension with left hemiplegia Left lower facial palsy

because of painful sensitiveness to sound from paralysis of the nerve to the stapedius muscle (Fig 5)

After its exit from the stylomastoid foramen the *peripheral* or *Bell's*



Fig 5—Paralysis of 7th (facial) nerve due to hemorrhage into pons

type of facial paralysis results in which the entire half of the face is paralyzed without any accompanying disturbances of taste or salivary secretion (Figs 6 7 and 8) In a *peripheral palsy*, in contradistinction to the central type emotional mobility is lacking i e, the mimetic muscles do not move

during emotional outbreaks as in laughing or crying as occurs for example in a lower facial paralysis accompanying a hemiplegia (Figs 9 10 11



Fig. 6—Right facial palsy (peripheral type)

and 12) Facial paralysis of the peripheral or Bell's type (*prosoplegia*) probably constitutes one of the commonest affections of the cranial nerves. Typical Bell's palsy generally follows exposure to cold or local chilling and may be in the nature of a neuritis. The etiologic role of focal infection is a debated one and the causes given for its appearance numerous e. g. basal fractures of the skull stab wounds of the face forceps deliveries mastoid



Fig 7—Left peripheral (Bell's) facial palsy (Note obliteration of forehead wrinkles on left side and effacement of nasolabial fold.)



Fig. 8—Facial palsy (late). Paralysis of the 7th nerve of the left side of face due to peripheral affliction (since all three branches, forehead, cheek, and chin, are involved). In contrast to central 7th nerve lesions.



Fig 9—Peripheral facial palsy Smiling



Fig 10—Facial palsy Whistling



Fig. 11—Peripheral facial palsy. Showing the teeth.



Fig 12—Facial palsy Closing the eyes

operations malignant parotid tumors multiple neuritis syphilis meningitis etc (Figs 13 14 and 15)

In the usual Bell's palsy the onset as a rule is sudden and may be ushered in by a geniculate neuralgia consisting of pain within and behind



Fig. 13—Right facial palsy Complete peripheral type following forceps delivery

the ear. The patient often discovers upon awakening in the morning that all the muscles on one side of his face are paralyzed and he is unable to wrinkle his forehead on the affected side wink or completely close his eye show his teeth or whistle. Food tends to collect between the teeth and the

cheek because of the *buccinator paralysis*. The corner of the mouth droops and saliva may drivel out. All the furrows and wrinkles are eradicated; the nasolabial line, too, is obliterated, and emotional expression is lost. Mild cases recover in from one to six weeks; cases of greater severity may last from two to eight months, while in those instances in which a reaction of degeneration develops (absence of response to both faradic and galvanic stimulation) the paralysis becomes permanent. In these cases secondary contractures, which produce considerable distortion and disfigurement,



Fig. 14—Carcinoma of left parotid gland with facial paralysis.

eventually appear. The mouth becomes drawn over to the affected side, making the normal side appear weaker, but on attempted voluntary innervation the contracted side is seen to be the one that is paralyzed. Abnormal associated movements and fibrillary twittings may also be observed. The articulation of labial sounds is interfered with, and the eversion of the lower eyelid causes tears to flow down the cheek. A paralytic ectropion may develop and *keratitis lagophthalmos* may ensue as a result of ulceration of the unduly exposed cornea, which undergoes desiccation and infection (Fig. 16).

Bilateral facial paralysis or *facial diplegia* is an uncommon condition, caused most often by an acute infectious polyneuritis and sometimes by diphtheria. Toxic states brought about by alcohol or arsenic, as well as encephalitis, basal syphilitic meningitis, or some progressive bulbar lesion, may be responsible for its occurrence. The facies is characteristic. Paralysis

of the entire face causes a flattened (ironed out) immobile and expressionless countenance. It stimulates in some respects the parkinsonian mask in which condition however there is no actual paralysis or the myasthenic



Fig. 15—Right facial palsy from carcinomatous infiltration of facial nerve

facies which is differentiated from it by the presence of bilateral ptosis. In facial diplegia the eyes are held wide open and tears overflow down the cheeks. The mouth likewise is held open and much dribbling of saliva occurs. Articulation and mastication of course are greatly disturbed.



Fig. 16—Right sided peripheral facial palsy. Eyelids surgically sutured to prevent corneal ulceration.

In some lesions of the *facial nerve proximal to the geniculate ganglion* following recovery the so-called *syndrome of crocodile tears* (Ford) may persist: *i. e.* lachrimation occurs while chewing or eating



Fig 17—Temporal lobe tumor. Left homonymous hemianopsia. Herniation of temporal lobe through and below old subtemporal decompression.

Thalamic or mimetic facial paralysis may occur at times as part of the thalamic syndrome due to lesions of the optic thalamus generally of a vascular nature (hemorrhage thrombosis or embolism) although neoplasms occasionally may give rise to almost the same clinical picture. The outstanding neurologic features of this syndrome are contralateral hemi



Fig. 18.—Right-sided facial spasm. Note during spasm involvement of platysma as well. Ten years standing.



Fig. 19—Facial spasm. Same patient as in Fig. 18 after spasm subsided

anesthesia and hemianalgesia with intractable pain over the anesthetic area known as *anesthesia dolorosa*. Hemiataxia, hemiparesis and hemianopsia (Fig 17) may also occur. Facial paresis is evident only during emotional expressions as when laughing, smiling or crying; voluntary movements are performed normally.

Supranuclear or central facial paralysis, although generally part of a hemiplegia, may also be produced by a tumor. The contralateral lower two thirds of the face supplied by the cervicofacial branches is paralyzed except as stated on involuntary emotional stimulation.

Facial spasm is sudden and characterized by involuntary muscular contraction which when persistent is termed tonic and when characterized by alternate contractions and relaxations is called clonic (Figs 18 and 19). The facial muscles are most frequently affected by spasm due, it is thought, to the intimate connections between mental processes and the facial muscles and also to the rapid reflex action of the muscles themselves. Reflex spasm indeed may occur as a result of painful affections anywhere along the distribution of the trigeminal nerve, for example, in diseases of the cornea and conjunctiva, in carious teeth, etc. Facial spasm also may be associated with the agonizing paroxysms of *tic douloureux* (trigeminal neuralgia). Facial spasm is not a particularly common complaint and generally starts in the orbicularis palpebrarum, gradually spreading until the entire side of the face is involved. The contractions are of a lightning shocklike character such as occurs following electric stimulation of the facial nerve and they cannot be voluntarily imitated, which fact differentiates them from tics or habit spasms which the patient can repeat at will. The condition tends to occur in individuals of neuropathic disposition. It is aggravated by emotional excitement, exertion, eating, speaking or exposure to cold. It is very refractory to any treatment short of producing a facial paralysis. In *blepharospasm* the tonic spasm is limited to the eye muscles. In *bilateral paraspasm* the entire facial musculature as well as the adjacent neck muscles are involved. In severe cases the contractions become almost continuous. Occasionally the patients discover various methods and maneuvers for temporarily checking the abnormal movements. Persistence of a spasm during sleep indicates that it is of organic and not psychogenic origin, although some reflex and other organic spasms do disappear during sleep. Occupational spasms of watchmakers have been described as being analogous to writer's cramp.

Facial spasms of cortical origin (focal epilepsy) result from some pathologic irritative focus in the precentral cortex controlling facial movements such as, for example, a cortical scar, a congenital or traumatic cyst or a brain tumor or abscess. *Jacksonian epilepsy* differs from ordinary epileptic



Fig. 20—Tetanic spasm. Tetanus infection. Exhibits patient in state of spasm shows typical independent, unrelated muscle group spasms of facial muscles (in contrast to other types of spasm due to nerve trunks as the *th* etc.) The head thrown back in the opisthotonos position.

seizures in that it starts with a local twitching of the face, hand or, less commonly of the foot and then spreads until the entire half of the body undergoes convulsive movements. Unless the attack becomes generalized there is no associated loss of consciousness as occurs in essential epilepsy of the *grand mal* type. Occasionally following severe attacks there may occur a transient postepileptic paralysis known as *Todd's paralysis*.



Fig. 21—Facial tic—dystonic spasm (Courtesy of Dr. Victor Gonda)

Fig. 20 is that of a patient in state of tetanic spasm showing typical independent unrelated muscle group spasms of facial muscles in contrast to other types of spasm due to affections of nerve trunks such as the seventh etc. The head is thrown back in the opisthotonos position.

Facial tics (habit spasms) are involuntary recurrent spasmodic movements of psychogenic origin which are extremely diversified in their manifestations and while simulating physiologic acts they are abnormal in

their inappropriateness their intensity and frequent repetition (Figs 21 and 22) They may be confined to a single muscle or group of muscles or they may affect the entire body (*maladie des tics* of Gilles de la Tourette) They are sometimes accompanied by *coprolalia* (an irresistible impulse to



Fig. 22—Facial tic—after recovery (Courtesy of Dr. Victor Gonda)

use profane and obscene language) The movements can readily be reproduced at will by the patient and are always a repetition of the same act Suppression of the movement by voluntary restraint however causes a certain feeling of tension and discomfort and is relieved by performance of the movement The commonest varieties of facial tics are frequent or rapid blinking of the eyes (mytation), rolling of the eyeballs wrinkling of the forehead smacking pursing pouting or licking the lips snuffing twitching biting or sucking in the cheek or mouth or jerking the head An exhaustive enumeration of all the different varieties would be difficult

indeed. Some individuals may have more than one tic occurring alternately or simultaneously. Thus one patient may blink his eyes and at the same time make snacking movements with his pouted lips, repeating the performance endlessly to his own annoyance and that of others.



Fig. 23—Hydrocephalus. Stretched skin and skull; dilated veins. Small weak face with characteristic expression.

Facial tics should not be confused with chorea, in which the movements are not stereotyped, but purposeless, incoordinated, constantly changing, and which cannot be reproduced or inhibited voluntarily by the patient. Rapid, clumsy jerkings are generally noted in the extremities as well.

Fibrillations of the muscles of the jaw are noted in neurosyphilis. Slow, bizarre, grimacing movements involve the muscles in athetosis.

Progressive facial hemiatrophy (Romberg's disease) causes a characteristic change of the facies. The atrophic process concerns all the structures of the face, including skin, subcutaneous fat, connective tissue, muscle,



Fig. 26. Process of eyelid due to involvement of central nervous system.

and bone. The atrophy may remain restricted to part of the face. If the whole side is affected, the patient appears *Janus faced*.

The face in *hydrocephalus* is triangular, with the base of the triangle above. The features, which are of normal size, present a marked contrast with the enormous forehead (Fig. 23).

Of principal interest from the standpoint of producing characteristic alterations in the facial expression, other than lesions of the facial nerve, which have already been discussed, are those involving the oculomotor or third nerve, the trochlear or fourth, and abducens or sixth nerve, all of which supply the external ocular muscles. Paralysis of any one of these will produce a *strabismus* or squint with diplopia due to overactivity of the antagonistic unparalyzed muscle, with the resulting loss of parallelism of the visual axes. The stimulation of noncorresponding points of the retina gives rise to *double vision*.

In addition to innervating all of the intrinsic ocular muscles except the superior oblique and external rectus, the oculomotor nerve also supplies the sphincter pupillae, the ciliary muscle, the contraction of which permits the lens to bulge in accommodation, and the levator palpebrae (Fig. 24). *Third nerve palsies* may be unilateral or bilateral, complete or partial, central or peripheral, isolated or combined with other neurologic lesions. Unilateral peripheral palsies are probably the commonest variety and are generally due to syphilitic basilar meningitis, although subarachnoid hemorrhage, tumors, and tuberculous meningitis may also be responsible.

The *Argyll Robertson pupil*, which is small and reacts in accommodation but not to light, represents a *partial oculomotor palsy* of the central type and is most commonly due to neurosyphilis and rarely to lethargic encephalitis. The diphtheria toxin may produce a partial central paralysis affecting, for example, only the muscle of accommodation. Recurrent vomiting and headaches associated with transient oculomotor palsy is termed *ophthalmoplegic migraine*. Paralysis of conjugate vertical movements (upwards or downwards), known as *Parinaud's syndrome*, may occur in connection with tumors of the quadrigeminal bodies. Paralysis of upward deviation occurs in pineal tumors.

In *Northridge's syndrome*, cerebellar ataxia associated with oculomotor paresis constitutes an important aspect of the myasthenia gravis syndrome. In a complete third nerve palsy, there occurs a divergent or external squint, the only movement being outward and downward ptosis of the upper lid, a dilated fixed pupil, inability to accommodate for near vision, and diplopia. In *progressive nuclear oculomotor paralysis*, the ptosis usually occurs after the superior, inferior, and internal rectus, and inferior oblique muscles have been affected (Bing).



Fig. 25a—Left-sided tonic facial spasm simulating facial palsy on right side or secondary contracture of left following facial paralysis of which no history however could be elicited. Note marked accentuation of left naso-labial fold and narrowing of palpebral fissure. During repose. Because of the apparent flattening of right side of face on casual inspection that would appear to be the paralyzed side.



Fig 25b—Wrinkling forehead and showing teeth demonstrates absence of any actual paralysis



Fig. 25c—While smiling. It will be noted that the right side remains frozen by the tonic spasm.

The *trochlear* or *fourth nerve* innervates the superior oblique muscle which pulls the eyeball down and out. *Isolated paralysis* is rare and causes a pronounced diplopia with dizziness on looking downward and outward as in descending stairs. To compensate for this diplopia the patient holds his head down with the chin directed toward the affected side.

The *abducens nerve* innervates the external rectus muscle which abducts the eye and has the longest unprotected intracranial course, which accounts for the great frequency of its involvement. Because of its compression against the pons by the posterior cerebral artery in cases of increased intracranial pressure its paralysis consequently has no localizing value. *Basilar affections* (fracture meningitis tumor) are frequent causes of *abducens palsy*; the causes of this condition are very much the same as those for oculomotor and trochlear palsy. Paralysis of the external rectus muscle causes a *convergent strabismus* or internal squint and the resulting diplopia makes the patient hold his head toward the affected side.

Paralytic strabismus must be differentiated from concomitant non-paralytic strabismus which appears in early infancy or childhood and may be due to errors of refraction or defect in the fusion sense. Concomitant strabismus may be convergent or divergent, alternating or constant, but unlike paralytic squint the visual axes always maintain the same relative position to each other regardless of what direction they may turn and no diplopia is present because of physiologic suppression of the double image.

Skew deviation refers to a peculiar little understood phenomenon in which one eye is directed downward and inward while the other eye is turned upward and outward and is met with in *cerebellar disease* more particularly of the middle cerebellar peduncle.

Diseases of the trigeminal nerve especially the motor branch which supplies most of the muscles of mastication will produce recognizable changes in the facial appearance. *Bilateral paralysis* occurring in *pseudobulbar palsy* and *extensive brain stem lesions* result in a vacant stupid expression due to the half opened mouth which cannot be closed tightly. The lower jaw cannot be protruded or moved from side to side. Food tends to fall out of the mouth and must be introduced into the pharynx with the fingers. In *unilateral paralysis of the fifth motor nerve* the jaw on opening the mouth is deviated to the paralyzed side and the jaw jerk is markedly increased.

Tonic spasm of the muscles of mastication is observed in strychnine poisoning tetanus and tetany (Figs 25a, 25b and 25c). *Grinding of the jaws* occurs in paralysis agitans as a reflex manifestation in children as for example from intestinal parasites.

The principal affection of the sensory division of the trigeminal nerve is the agonizingly painful *trix douloureux* (trigeminal neuralgia) which may occur in any one or all of its three branches the second or third most commonly the first is rarely affected alone. The paroxysms come on with lightninglike suddenness and are of a sharp lancinating character. The face is deeply flushed and is contorted by spasm indicative of the intense



Fig. 26—Face in Weber's syndrome

suffering salivation and lachrimation may also occur. There are characteristic dolorogenetic or *trigger zones* on the skin or mucous membrane the stimulation of which will precipitate an attack. This may occur spontaneously however or may be evoked by talking chewing swallowing shaving brushing the teeth or by a cold wind.

Herpes zoster of the trigeminal nerve is usually limited to one of the divisions of the fifth nerve. Pain and redness occur in the skin followed by a vesicular eruption. In affection of the ophthalmic root vesicle formation on the cornea may result in ulceration. Severe pains in the affected

area, a postherpetic neuralgia, associated with paresthesia and trophic changes is a frequent sequela. The aspect of numerous more or less deep scars, spread over an area of the face which corresponded to a division of the fifth nerve, reveals the nature of this condition at the first look.

Crossed or alternating hemiplegias occur in brain stem lesions (medulla, pons, crus) above the pyramidal decussation and are clinically characterized by a contralateral hemiplegia (paralysis of the opposite arm and leg) together with a homolateral cranial nerve paralysis, i. e., one on the same side as the lesion which may be in the nature of a vascular softening or hemorrhage, or which may be neoplastic. In *Weber's syndrome* (Fig 26) there occurs a homolateral third nerve palsy and a contralateral hemiplegia which indicates a meningoencephalic or mid brain lesion in the region of the cerebral peduncles. In *Benedict's syndrome* there is also a third nerve involvement with, however, a contralateral tremor instead of paralysis due to the implication of the red nucleus. The *Millard Gubler syndrome* is distinguished clinically by a homolateral facial paralysis of the complete or peripheral type along with a paralysis of the opposite side of the body, and is due to a pontine lesion, as is *Foville's syndrome*, which in addition to the seventh nerve paralysis also shows an involvement of the sixth nerve as well, with a resulting impairment of lateral vision on the affected side.

Horner's syndrome is characterized essentially by a constriction of the pupil (miosis) due to a paralysis of the dilator fibers of the iris and narrowing of the palpebral fissure due to a ptosis of the upper lid caused by a paralysis of the superior tarsal muscle. Besides the miosis and ptosis an *enophthalmos* or *recession of the eyeball* due to a paralysis of Mueller's retroorbital muscle may be noted, as well as an *anhidrosis* or absence of sweating on the affected side. This syndrome may be produced by a wide variety of lesions affecting the cervical sympathetic trunk or the ciliospinal center in the lower cervical or upper dorsal segments of the spinal cord. It can occur accordingly in syringomyelia, spinal cord tumors, cervical rib, hypertrophic pachymeningitis, operations on the neck, etc.

Gradenigo's syndrome occurs occasionally as a complication of suppurative otitis media, in which the inflammatory process involves the meninges overlying the petrous apex of the temporal bone. Palsy of the external rectus due to abducens involvement and pain of trigeminal distribution are the outstanding features.

Myasthenia gravis is a rather uncommon, incurable affection of obscure origin and causation, occurring in the early decades of life, especially in females. It is characterized by marked fatigability of the muscular system with the development of transient palsies that disappear upon rest only.



Fig 27—Myasthenia gravis. Note sleepy expression and partial ptosis of lids and drooping of angles of mouth. Patient is supporting chin with finger to prevent head from dropping on the chest.



Fig. 28—Myasthenia gravis

to reappear following exertion. Since the muscles of the head and neck, especially those innervated by the bulbar nuclei, are predominantly involved, the facies produced is so typical as to be practically pathognomonic of the disease. The facial masticatory and oculomotor muscles are implicated early, either separately or successively, as the condition tends to be a slowly progressive one. The unfortunate victims often die as a result of cardiac or respiratory failure precipitated suddenly and unexpectedly in some instances by crying or laughing or other violent emotional upheavals so that literally they may "die laughing."

At the onset of the condition the individual may first experience difficulty in chewing, swallowing or talking because of marked fatigability with exhaustion, or he may notice that his eyelids droop or his vision becomes doubled particularly towards evening or when tired. Upon waking in the morning he may be entirely free from symptoms for a while but as the day wears on a drowsy, sleepy, somewhat sorrowful expression appears on his face due to the drooping of one or both of the upper eyelids and the general relaxation of the facial musculature with sagging of the angles of the mouth. The chin tends to fall on the chest unless supported by the hand.

The *myasthenic facies* is characterized thus by an almost expressionless mask (Figs. 27 and 28). The face in other words appears flattened or ironed out and devoid of wrinkles. The sleepy aspect is produced by the ptotic lids. On attempting to smile the so-called myasthenic *nasal smile* results which is however more like a snarl or a sneer due to the fact that only the nasolabial elevators participate because the zygomaticus and risorius are paretic. This may occur on only one side of the face, the other side perhaps is normal and gives rise therefore to an asymmetrical appearance.

Myotonia atrophica is an extremely uncommon dystrophy of specialized distribution occurring as a rule between the ages of twenty to thirty. The muscles of the face undergo wasting with the production of the so-called myopathic facies ("hatchet face" of Wechsler) characterized by the loose pouting lips (*tafia mouth*) due to the relaxation of the orbicularis oris during exertion of the buccal mucosa. This muscular weakness also is manifested by the inability of the patient to whistle or to inflate his cheeks. The orbicular muscle of the eye is also involved as evidenced by the inability to close the eyes tightly. Either a slight drooping of the upper lid or a widening of the palpebral fissure with exophthalmos may be noted. In the typical case the *transverse smile* (*rire en travers*) is quite striking on pleasant emotional stimulation. The sternocleidomastoid muscle, the extensors of the arms, the quadratus femoris and supinator longus



Fig. 29—Bulbar palsy of amyotrophic lateral sclerosis in a completely anarthric patient with emotional instability often encountered in these cases. Note marked atrophy of the muscles about the mouth with falling of the cheeks.



Fig. 30—Amyotrophic lateral sclerosis during spontaneous crying spell. These occur suddenly without provocation or for any reason whatever. They last for only a few seconds and suddenly disappear.



Fig. 31a—Patient suffering from bulbar paralysis. Double ptosis, slight external strabismus, facial paralysis, with lack of facial expression and inability to close the lips are to be seen. The effort to open the eyes causes a wrinkling of the forehead. (From Starr.)



Fig. 31b—Bulbar paralysis. Double ptosis, with external strabismus, flattening of the face, inability to close the mouth and atrophy of the right half of the tongue are to be seen. (Iconog. de la Salpêtrière, from Starr.)

are also involved in the atrophic process with which excessive salivation and lacrimation speech defects cataract formation and at times progressive intellectual deterioration are frequently associated

Facioscapulohumeral muscular paralysis (Landouzy Dejerine type) is a type of progressive muscular dystrophy affecting the face and shoulder girdle muscles which undergo very marked atrophy the process starting quite early in life The myopathic facies which results is much the same as that described for myotonia atrophica which is a very similar if not an identical condition Because of the atrophy of the orbicularis muscle the lower lips sag giving rise to the "upturned mouth"

Progressive bulbar palsy (progressive glossopharyngolabial paralysis) is in reality amyotrophic lateral sclerosis of bulbar distribution and often represents the terminal stage of the disease although in some instances the process may start and remain bulbar throughout its course which is quite uniformly fatal Aspiration pneumonia is responsible for death in many cases The disease is a degenerative one of unknown etiology occurring in advanced age and pathologically characterized by a destruction of the motor nuclei in the medulla and pons with a resulting atrophy of the muscles so supplied The tongue is usually affected first fatigue occurs on slight use and consonants are produced with difficulty speech eventually becomes quite indistinct and finally complete anarthria supervenes Almost constant fibrillary twitchings can be observed in the tongue which undergoes such marked atrophy as to become utterly useless in phonation and deglutition Involvement of the facial nuclei results in fibrillations and wasting of the mimetic muscles The cheeks become sunken the lips are thinned out and the lower jaw sags (Figs 29 30 and 31a and 31b)

With the pharyngeal and palatal paralyses nasal regurgitation occurs and greatly interferes with the nutrition of the patient who then must be fed through a tube Stroking the skin of the lips will produce the so-called pouting or sucking reflex which is quite typical These patients show extreme emotional lability and are subject to spontaneous laughing or crying spells When anarthria has developed they may cry without making a sound The facial expression alone reveals their emotional state These spells however are of short duration and disappear as suddenly and unaccountably as they come

In *pseudobulbar palsy* which must be differentiated from this condition an explosive violent forced type of laughing and weeping is also noted Pseudobulbar or cerebral bulbar palsy is not a clinical entity but is rather a bulbar syndrome of multiple etiology representing a bilateral cerebral lesion generally in the nature of an encephalomalacia or softening due to arterial disease although infections degenerations and syphilitic

vascular disease may be responsible occasionally. The condition occurs in a patient who previously had a hemiplegia and then develops one on the healthy side along with the bulbar symptoms as a result of the interruption of the corticobulbar pathways from both cortices. Unlike true bulbar palsy, no muscular atrophy, fibrillary twitching, or reaction of degeneration occurs, and some degree of improvement generally takes place in pseudo bulbar palsy while the other condition, as its name implies, is progressive. In addition to the signs of bilateral hemiplegia (spastic gait, Babinski sign, absent abdominal reflexes, etc.) are the associated bulbar symptoms consisting of speech disturbance and difficulty in mastication and deglutition. The face wears a sad, forlorn expression and displays unprovoked, highly exaggerated emotional reactions that are beyond voluntary control. Except for these emotional outbursts the face is otherwise quite inexpressive almost parkinsonian in its rigidity.

In *multiple sclerosis*, while the temperament is predominantly cheerful and optimistic despite the progression and hopeless outlook of the disease the facial expression is inclined to be a vacuous one, punctuated, however by inappropriate smiles or laughter as emotional instability is quite common. Nystagmus along with scanning speech and intention tremor constitutes one of the diagnostic signs of the Charcot triad which is not present in all cases by any means. The nystagmus or oscillatory movement of the eyeballs is chiefly noted on lateral fixation, but may be spontaneous even on frontal fixation in the advanced stage.

Progressive hepatolenticular degeneration (Wilson's disease) is likewise characterized by excessive emotionalism, the mood tends to be persistently euphoric, exaggerated, forced laughing and other expressions of unrestrained mirth occur on the slightest provocation. The typical facies representative of the fixed emotion occurs relatively late in the disease and is exemplified by the spastic smile or grin so designated because of its long duration due to contracture of the facial muscles. This phenomenon may be observed also in double hemiplegia. Hepatolenticular degeneration is a very rare, familial, progressively fatal disease chiefly affecting adolescents. It is characterized by the development of a 'lob nail' cirrhosis of the liver, along with bilateral athetosis due to the involvement of the lenticular nuclei of the basal ganglia. The extremities are spastic and eventually develop disabling contractures. Dysphagia, dysarthria and dementia are rather prominent clinical features of this condition.

Arterial disease of the brain (cerebral arteriosclerosis) and cerebral softening due to hemorrhage, thrombosis, and embolism may be attended by emotional as well as mental and personality changes. Sudden and unaccountable swings in mood occur quite commonly as do unprovoked laugh



Fig. 32—Tabetic facies. Patient blind as a result of bilateral primary optic atrophy.

ing or crying spells. Brain tumors especially those involving the frontal lobes may be accompanied by alterations in the emotional reactions. The forced artificial jocularity and facetiousness (*Witzelsucht*) occurring in frontal lobe tumors is quite well known. This abnormal emotional reactivity is reflected of course in the play of facial expression.

Tabes dorsalis produces a fairly typical facial expression in a certain percentage of the cases that is spoken of as the *tabetic facies* and is characterized by a rather sleepy sorrowful expression due to the partial ptosis or drooping of the upper lid. Frequently there occurs an associated compensatory wrinkling of the forehead in an attempt to elevate the sagging lids. The anisocoria or pupillary inequality is often obvious at a glance as are the miotic Argyll Robertson pupils. Oculomotor palsy is very frequent in tabes and is generally complete and unilateral. The occurrence of primary optic atrophy with blindness gives a rather typical blank sightless expression to the face that may be quite striking. In tabes the face is inclined to be sallow complexioned, lean, and emotionally unexpressive (Fig. 32).

Paralysis agitans was first adequately described by Parkinson in 1817 in a classic essay on *Shaking Palsy*, in which he gave the following remarkably succinct description embodying the essential features of the condition.

Involuntary tremulous motion with lessened muscular power with a propensity to bend the trunk forward and to pass from a walking to a running pace (*festinating gait*) the senses and intellect being unimpaired. *Paralysis agitans* is a chronic slowly progressive degenerative disease of the basal ganglia occurring in the *senium* (50 to 70). It is characterized essentially by an increased muscular tonus of rigidity along with a spontaneous passive or rest tremor generally of a coarse character and in the hands is often of the so-called *pill rolling* variety (the predepression *money counting* tremor). Tremors about the face are uncommon despite the frequency of the head tremor which may be of the affirmative or negative variety, i. e. there may be a constant head nodding or shaking from side to side. The generalized muscular rigidity of the facial musculature produces the pathognomonic *parkinsonian mask* with its stiff solid starchy expressionless appearance. The eyes appear starty due to slightly retracted lids which wink infrequently. In looking at objects off to the side the eyes alone may turn there being a lack of associated movements of the head. There is a typical slowness and deliberation about the speech and all voluntary movements as well. Automatic acts may be performed only by dint of much concentrated effort making them quite exhausting to the patient who becomes rather listless and phlegmatic doing only what is absolutely necessary. The face appears smooth due to the obliteration

tion of wrinkles and it may have a somewhat greasy aspect. Vasomotor disturbances in the form of flushing may occur and a distressing salivary drivel may contribute to the patient's misery, all of which may throw him into a state of darkest depression with ideas of self-destruction being uppermost in his mind, but because of the profound inertia these ideas are seldom carried out. Emotional instability, however, is the general rule.

Postencephalitic parkinsonism is an affection of the extrapyramidal system, but its infectious-inflammatory origin produces very much the same clinical picture in general. The symptoms of *lethargic epidemic encephalitis* are more richly diversified in their clinical manifestations which may simulate almost any neurologic condition. It may be broadly considered in the acute, intermediate and chronic stages. The acute stage may be very transitory and is often forgotten altogether by the patient. The predominating symptoms may be of a catarrhal inflammation of the upper respiratory tract with headache and lethargy, or perhaps periods of diplopia, ptosis, nystagmus, pupillary disturbances, various types of ophthalmoplegia, facial weakness, tremors and convulsions may occur as well as a reversal of the sleep pattern, i. e. the patient may sleep during the day and remain awake at night. During the influenza epidemic of 1916 to 1917 epidemic encephalitis first became generally recognized although the disease doubtlessly existed long before then. Frequently the distressing and disabling postencephalitic parkinsonian state would not appear until after a latent period of 5, 10, or even 15 years from the time of the original infection which may have been so mild as to have been completely forgotten (Fig. 33). In other instances the onset was so insidious as to make its exact determination difficult and frequently no history of an antecedent attack of influenza or sleeping sickness could be elicited. This indicated that the pathologic process was probably in the nature of a low-grade but progressive chronic encephalitis. The intermediate state occurring after the original infection is of variable duration and is marked by the vagueness of the complaints which may be chiefly fatigue, memory impairment and ill defined manifestations often diagnosed as psychoneurotic or neurasthenic.

With the advent of the chronic stage the typical symptoms of the parkinsonian state appear as shown by the masklike facies, the stooped posture, the cog-wheel rigidity, the slowness of speech and all movements, the propulsive and retropulsive gait, the excessive salivation and sweating and the pill-rolling tremor (Figs. 34 and 35). The facies very closely simulates that already described for paralysis agitans, making a differential diagnosis difficult in some instances by mere inspection of the face alone without the aid of supplementary history. The occurrence, however, of the parkin-



Fig 33—Postencephalic parkinsonism



Fig. 34—The so-called parkinsonian mask, or frozen facies.



Fig. 35—Parkinsonism. Note suggested Mona Lisa smile despite general stolidity of features.

sonian mask in a relatively young individual makes the diagnosis of paralysis agitans unlikely as it affects chiefly the older age group

As stated the parkinsonian facies presents a blank immobile unresponsive appearance the partly opened mouth adds a touch of stupidity The skin is smooth and greasy salivary dribbling is common as are attacks of blepharospasm during which the eyelids are tightly and involuntarily closed and the patient is unable to open his eyes until the tonic spasm relaxes (Figs 36 37 38 and 39) Closely related to this phenomenon are the pathognomonic *oculogyric crises* which are characterized by upward conjugate deviation of the eyes that is the eyes are forcibly and involuntarily drawn heavenward as in religious devotion and the unfortunate patient is unable to bring them into their normal position until the spasm subsides which may take a few seconds minutes or hours (Fig 40) Rarely the eyes may be drawn to the sides in skew deviation Considerable emotional perturbation accompanies these attacks and the individuals are in constant dread that they may occur while they are crossing streets or in some other precarious situation Drowsiness or sleep may follow these attacks just as in epileptic seizures They are most prone to occur toward the end of the day or as a result of overexertion or emotional excitement Therapeutically nothing as yet has been found to be of any avail

Facial spasms grimacing and contortions constitute a rather conspicuous aspect of certain neurologic conditions attended by muscular overactivity notably *chorea* (*Sydenham's* and *Huntington's*) *Sydenham's chorea* (*St Vitus' dance*) represents a cerebral manifestation of rheumatic fever and a complicating endocarditis develops in a considerable percentage of the cases The facial as well as the skeletal muscles participate in the rapid uncoordinated purposeless involuntary jerks and twistings which generally start in the extremities spread to the face and which later may involve the entire body Occasionally the choreic movements may have a hemiplegic distribution (*hemichorea*) which must be differentiated from posthemiplegic *hemichorea* following a cerebral vascular injury The facial twitchings in *Sydenham's chorea* are asymmetrical irregular and arrhythmic producing an endless variety of facial expressions no two of which are precisely the same although all are in the nature of wry mouthed smirks and grimaces The choreic patient is obstinate wilful temperamental and subject to causeless emotional outbreaks

Huntington's chorea is a chronic disorder beginning usually between the ages of 30 and 50 years characterized by grimacing gesticulating lurching and ataxic difficulty in walking accompanied by a gradual loss of the mental faculties ending in dementia It is hereditary and is due to pro-



Fig. 36—Postencephalitic parkinsonism with typical facies, taken during period of blepharospasm.



Fig 37—Same patient as in Fig 36 Lateral view

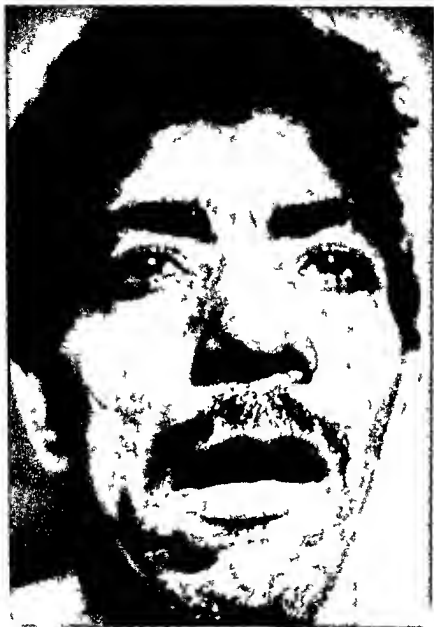


Fig 38—Parkinsonism after blepharospasm subsided. (Same patient as in Fig 36)



Fig. 39—Postencephalic parkinsonism. Same patient as in Fig. 36. Note flexed attitude of upper extremities and so-called "wooden posture."



Fig. 40—Oculogyric crises of postencephalitic parkinsonism. Eyeballs forcibly drawn upward and patient is unable to bring them down voluntarily until spasm relaxes.

found changes in the static bodies and the globus pallidus with degeneration in the cortical cells of the brain (Figs 41-42-43)

In *dystonia musculorum deformans* choreiform and athetoid movements of the extremities are observed as well as peculiar twisting or torsion



Fig. 41—Huntington's chorea. Note grimacing. Patient holds head to prevent violent jerking movements.

spasms involving the pelvis. The face likewise is the site of muscular distortions similar to those already described except that they are not quite as rapid (Figs 44-44a to 44g)

Little's disease (*congenital spastic diplegia*) is also characterized by facial grimacing but unlike the types mentioned it is of a rather slow spastic character occasioned by the difficulty in relaxation of the contracted muscle



Fig 42—Huntington's chorea

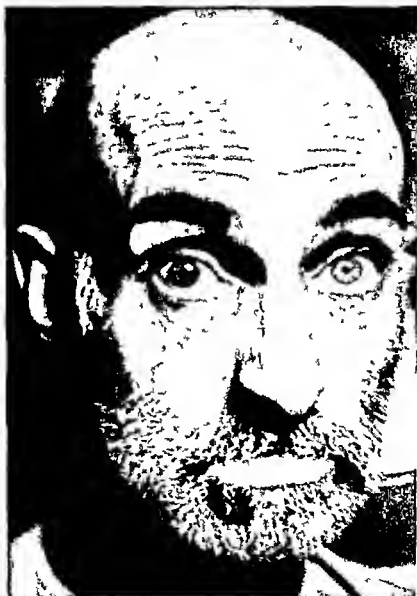


Fig. 43—Huntington's chorea.



Fig. 44—Dystonia musculorum deformans. (This is the first of a series of eight exposures shown in Figs. 44 to 44g.) Violent generalized choreiform involuntary muscular jerking is a characteristic feature of this disease. Note facial contortions, grimacing alternating with relaxation.



Fig. 44a—*Dystonia musculorum deformans*.



Fig 44b—Dystonia musculorum deformans



Fig. 44c—Dystonia musculorum deformans.



Fig. 44d—Dystonia musculorum deformans.



Fig. 44e—*Dystonia musculorum deformans*



Fig 44f—Dystonia musculorum deformans



Fig. 45b—Epileptiform seizure in chronic alcoholic. Frothing at the mouth, violent twitching of facial muscles. Eyes in conjugate deviation to the right.



Fig. 45c—After epileptiform seizure in chronic alcohol c. Note drooling of saliva and complete relaxation of facial musculature



Fig. 46—Post traumatic epilepsy due to cortical scar. Note craniotomy scar.

In *essential or idiopathic epilepsy* and *symptomatic epilepsy* (alcoholism dementia paralytica [general paresis] arteriosclerosis neoplasm uremia) the facial muscles undergo tonic and clonic contractions along with the rest of the voluntary muscles. In *petit mal* attacks which are momentary losses of consciousness without any convulsive manifestations except for a slight blanching of the face along with blinking or muscular twitchings and a strange blank stary expression there may be no other



Fig 47—Von Recklinghausen's disease. Before and after operation (Courtesy of Dr J E Schaefer)

visible evidences announcing its presence. In the typical *grand mal* seizure however there is generally an antecedent intense pallor of the face. The loss of consciousness may be sudden and without warning or it may be preceded by a wide variety of motor sensory or visceral *aurae*. The tonic phase of generalized *decerebrate rigidity* that follows is attended by a vigorous persistent contraction of all the facial muscles and because of the cessation of respiration varying degrees of cyanosis may appear. The general muscular relaxation that ensues is closely followed by the clonic phase during which alternate muscular contractions and relaxations occur and are often of a most vigorous character. Marked twitching of the facial muscles with forcible blinking of the

eyes is noted and frothy occasionally blood tinged saliva issues from the mouth. The tongue and lips are often bitten (Figs 45a 45b and 45c). The *clonic phase* may last from three to five minutes gradually subsiding leaving an exhausted completely relaxed patient breathing stertorously and often blowing out his cheeks and lapsing into a stupor or normal sleep. In cerebral apoplexy the convulsive manifestations are not at all dissimilar to those of idiopathic epilepsy and during the coma flapping of the cheeks and spitting of the lips are quite commonly observed (Fig 46).

Frontal hyperostosis or thickening of the frontal bone is not infrequent as has been emphasized by Cushing and is associated with meningiomas. The bony swelling so produced may be just a slight smooth elevation or it may attain quite formidable dimensions and be of domelike contour.

Plexiform neuromas of the scalp occur as a manifestation of generalized neurofibromatosis or *von Recklinghausen's disease* which is a congenital occasionally hereditary or familial condition marked by the occurrence of multiple tumors in the peripheral nerves. Involvement of a nerve trunk with all its ramifications is spoken of as a *plexiform neuroma* the frontal and temporal region of the scalp being sites of predilection. The tumor mass is associated with a marked overgrowth of the overlying skin and may be of such extent as to cover completely one side of the face (Fig 47).

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CHAPTER XXI

MENTAL DISEASES AND THE FACE

THE question whether or not there is a close relationship between man's intelligence and the size and shape of his head has been and still is of great interest. Comparative investigations showed that a general relationship existed between the volume of the head and cultural evolution as revealed in studies of the anthropoid apes, prehistoric man, primitive races and civilized man. Measurements reveal an increase from 621 cc. of skull capacity for apes up to 1300 cc. for the Andaman Islanders (average for males), 1350 cc. for Negroes, 1490 cc. for Europeans.

The horizontal circumference of the head shows typical differences in psychoses as well as in *pyknics* and *leptosomes*. A great difference exists in regard to cephalic length in leptosomes and pyknics. *Schizophrenics* and among them the leptosomes seem to have the shortest heads. The same groups showed the smallest horizontal circumference and the smallest cephalic width.

Kretschmer points to the fact that as long as psychiatry took the standpoint that mental diseases are exclusively cerebral diseases, special significance was given to the cranial capsule as the seat of the brain. Apart from the brain, however, the endocrine glands, the chemism of the entire body, play a decisive role in the mental disposition and the structure of the body, especially obvious in the thyroid gland. We must admit that the physical as well as the mental types of cretins vary, and that the influences of the endocrines in regard to the resulting mind capacity and physical type of the individual do not always run parallel; nevertheless, in the majority of cases a correlation exists between the body configuration and the mind. The same may be said for the endocrine influence of the generative glands, in which a distinct correlation exists, as shown in the physical and mental types in eunuchoids and castrates.

The face is the calling card of the individual. The psychomotor formula of the individual is found condensed in facial expression; the constitutional formula of a human being (his endocrine formula) is betrayed by his facial structure. Thus the anatomic structure of the face becomes an important index of his mental status based upon mimetic innervation.

Kretschmer observed in typical cases of asthenic schizophrenic patients a facies represented by thin soft parts, thin skin, poor in fat, pale and narrow in cranial circumference (55.3 cm.). In a large series of asthenic schizophrenic faces he noted an increased nasal length and retraction.

the lower jaw often especially noticeable in profile view. The nasal form is in the main narrow thin sharp pinched and long with straight or bent nasal bridge (Figs 1 2 3 and 4). The frontal view of such a face offers in typical cases an egg shaped contour shortened outlines of the



Fig 1—Schizophrenic.

mandible abruptly join from the ears upward in line with the maxillary angle. Lack of panniculus adiposus of the lateral part of the cheek, the thin and short ramus of the lower jaw and the small surface of the oral floor are especially responsible for the facial contour.

The facial structure in asthenic women differs from that of men in that the transverse measurements as well as the vertical are shortened. In women the face does not appear small and oblong as in the corresponding

male types, but short and atrophic however the narrow, pointed nasal shape and underdeveloped jaw often parallel the male development. Atypical and transitional forms are more frequent in women than in the male.

The faces of the *athletic schizophrénics* are characterized according to Kretschmer and others by a steep egg shape a certain high headedness. The skin is coarse and usually pale. The robust bone development is noted in the distinctly marked supraorbital arches zygomatic bones and



Fig. 2—Schizophrenic during insulin coma.

massive lower jaw. The average cranial form is high and narrow while the cranial circumference is of average dimension. In contrast with the schizophrenic angular profile the profile here in general represents pug-nosed forms and high chins.

If the vertical diameter of the face is large a steep egg shape results. The maxillary contours ascend steeply to the ears and the tip of the chin appears almost pressed downward. The characteristic pyknic heads appear on the contrary rather long and low long in the sense of profile contour.

If the longitudinal development is not so pronounced and the lower jaw shows a broader and flatter modelling a scutiform (shield shaped) facial contour results.

Typical pyknic faces show the same as the general physical structure of pyknics a tendency toward broadness and roundness. The skull is large round broad. The facial skin is transparent and the cheeks



Fig. 3a—Schizophrenic Typical posture.

nose are often of reddish color. The increase of fat is pronounced and may be found especially in advanced age deposited in the region of the lower jaw, and on the lateral parts of the lower cheeks in front of the maxillary angle. The entire round softness of adolescent pyknic faces



Fig. 36—Schizophrenic. Typical posture

corresponds well in some types of *cyclothymic temperament* with cordial geniality.

The medium high and broad faces of pyknics show in typical cases in frontal aspect a flat pentagon.

The forehead of circular pyknics is generally well developed, broad and curved. The cranial circumference (57.3 cm.) is larger than that of other types, especially in the male.



Fig. 3c—Schizophrenic Typical posture



Fig. 4a—Mental defective with schizophrenia. Developed a peculiar mannerism as a result of a somatic psychic delusion. Holds his hand against his head to prevent it from bursting. When one hand was pulled down the other one went up immediately to take its place. Because of the long duration of this mannerism contraction of the fingers occurred. The mannerism was cured by placing both upper extremities in circular plaster of paris casts for a week. While he still hears voices, he is able to work effectively.

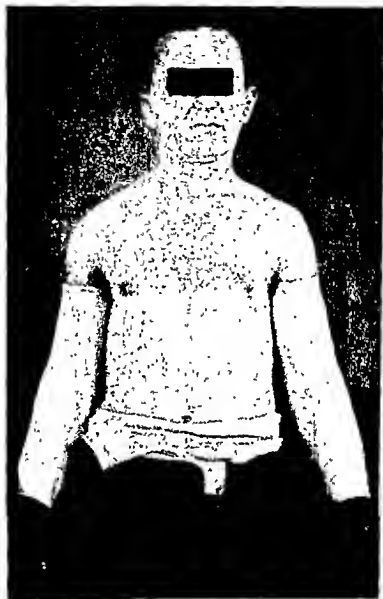


Fig. 46—Upper extremities encased in plaster-of-paris casts to "wean" patient from assumed positions.



Fig. 4c—Same patient. Plaster casts removed. Results excellent as far as extremities are concerned.

The eyes of circular pyknics are frequently deep lying and small exophthalmos may occur

Kretschmer summarizes *dysplastic special types* as small groups of considerable variant. He distinguishes the eunuchoid high growth the eunuchoid and polyglandular fat-growth as well as the group of infantile and hypoplastic types



Fig. 5—Long standing schizophrenic. Note posture. He would retain this for hours at a time.

Kretschmer stresses the significance of the constitutional types for the two large psychotic entities—the circular or manic-depressive insanity and *schizophrenia* (*dementia praecox*) (Figs. 5 and 6)

Kretschmer summarizes his results as follows: 1. A distinct biologic affinity exists between the mental disposition of the manic-depressive patient and the physical structure of the pyknic. 2. A distinct biologic affinity exists between the mental disposition of the schizophrenics and the physical structure of the asthenic, athletic and certain types of dysplastic patients. On the other hand, only a slight affinity exists between the schizophrenic and pyknic patients.

The greatest precaution is to be observed in the generalization of the physiognomic interpretation of the facies in psychiatry. For example, a disproportion between forehead, middle parts of the face and parts of the chin may be the expression of a disharmonious psychopathologic disposi-

tion. This reciprocal relation however does not necessarily or even frequently occur.



Fig. 6—Man c depressive circular type

Facial expression is surely of great importance in interpretations of the psychic and mental constitution of the individual. The dull troubled look of the *hypochondriac* is as well known as the features of ill humor in neurotics who live in contradiction to their surroundings. *Imbecility and mental deficiency* may find expression in a dull lifeless look and in lack of liveliness of the play of the facial muscles (Fig. 7). The so-called im

becile smile (Fig 8) of many feeble-minded persons is well known. However, the expressionless face of some schizophrenics may be interpreted as an expression of mental deficiency while in reality only the affectivity



Fig. 7—Mental deficiency without psychosis. Imbecile type

and not the intellect is involved. Other well known signs are for instance the so-called *mimetic atavism* in paralytics, the certain sentimentality of the cerebral arteriosclerotics and the *mimetic inflexibility* in Parkinson's disease (*postencephalitis* & *paralysis agitans*). At any rate isolated features

cannot be decisive for the diagnosis of a certain clinical entity, but must be evaluated with other clinical manifestations

Fruhmann attaches a special significance to the evaluation of facial expression in mental aberration. He states: 'The mimetic and physiog-



Fig. 8—Manic depressive, manic type

nostic means of expression of mentally diseased persons often deviate greatly from those of mentally normal individuals. Almost all mental patients and almost every form of mental disease display peculiar facial aspects, which may be utilized as a diagnostic means.'

The facial expression in *epilepsy* (Figs 9 and 10) is peculiar in many ways. Tonic and clonic convulsions of the facial muscles may change dur-

ing an attack. During the aura which ushers in the attack proper the angles of the mouth and eyes move actively or are shut spasmodically. Frequently this occurs first on one side and later on the opposite side. During the aura



Fig. 9—Mental defective epileptic. The face bears numerous scars, resulting from injuries sustained during convulsions. Patient has a vicious habit of biting other patients, some of whom have developed serious infections.

a partial or general contraction or dilatation of the blood vessels occurs, which is manifested by paleness or redness in the face; changes in these are rapid. In more violent attacks, the saliva, by reason of forceful oral respiration following tonic contractions, is whipped into foam which is sometimes bloody due to trauma of the tongue while it moves between the



Fig 10—Deteriorated epileptic

teeth. During the attack the pupils usually show myosis at the beginning, later mydriasis and rigidity ensue. The normal reaction gradually returns after the attack. In advanced and continued cases the features of the



Fig. 11.—Involutional melancholia. Man 65 years of age. Marked arteriosclerosis. Is constantly in a state of depression and despondence repeating some dolorous apprehensive or fearful utterance. Develops frequent infections and a bronchial pneumonia proved fatal. Note despondent and depressed facial characteristics.

patient's face become still more prominent, especially if congenital asymmetry of the cranium exists.

The *facial expression in melancholia* (Fig. 11) is characterized especially by the eyes and mouth as well as so-called *grief muscles*. The eye of the melancholic patient is mostly dull. The palpebral fissures are frequently narrow. The upper lids are often lowered as in defense or

protection. A rectangular furrowing of the forehead on occasion horseshoe shaped, takes place because of simultaneous stimulation of the frontal nerves and the contractions of the corrugators innervated by them.



Fig. 12—Involutional melancholia. Note typical hand wringing posture.

Since the circular muscles of the eye contract more powerfully toward the middle and thus smooth the external frontal triads the mid triad of the frontal skin is principally or even exclusively affected by the characteristic furrowing.

In a young patient suffering from melancholia who was afraid of being beheaded the horizontal furrowing appeared only in the middle above

the root of the nose. In grave cases of melancholia the forehead usually shows transverse furrowings. The vertical furrows above the root of the nose result from the contraction of the superciliary corrugators which bring the eyebrows together. Occasionally only the inner end of the eyebrows is raised with only unilateral frontal wrinkling.



Fig. 13—Involutional melancholia

The orofacial muscles distinctly contribute toward stressing the expression of melancholia. The sad expression is especially accentuated from a strong development of the nasolabial fold (Fig. 12). It is further intensified by the drooping of the angles of the mouth and the protrusion of the lower lip.

Involutional melancholia is generally preceded by a period during which the patient may complain of vague head symptoms such as pressure pain, vertigo, together with anorexia, irritability, insomnia, mental deficiency, and a mild neurastheniform state with perhaps some emaciation. The symptoms increase progressively, and the patient develops depression with agitation, apprehension, fear of impending danger, and quite often delusions of having sinned (Fig. 13).

Ziehen found paresis of the facial nerve in melancholics during rest as well as during mimetic motion. After recovery this disappeared.

The upper as well as the lower half of the face is afflicted in severe cases of melancholia. As a result of fear or other violent emotion, control over



Fig. 14—Arteriosclerosis. Mental deterioration characterized by apprehension. Note expression of lack of confidence and fear of person approaching.

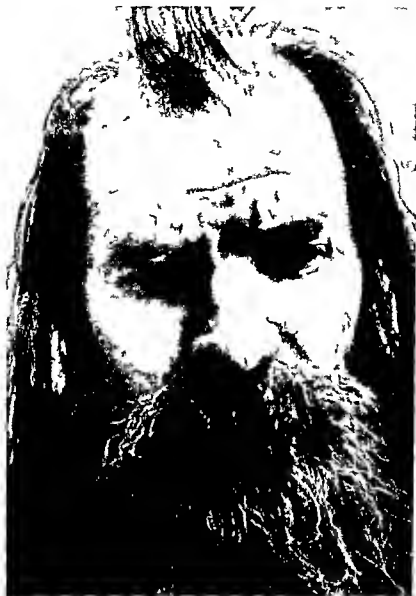


Fig. 15—Mental depression in a patient with arteriosclerosis.

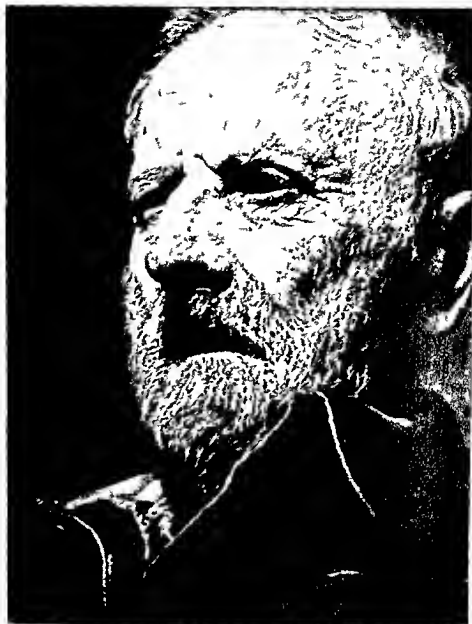


Fig 16—Senile deterioration. Fairly well developed male 87 years of age. Marked arteriosclerosis. He becomes very upset when the word democrat is mentioned in his presence. States he despises democrats and holds them accountable for his troubles as well as those of the world in general.

the voluntary eye muscles as well as other muscle groups may be lost eventuating in a disturbed facial expression characterized by an uncertainty of the direction of the glance and fluttering unrest of the eyelid muscles



Fig. 1.—Cerebral arteriosclerosis with mental dilapidation and marked emotional lability. Patient 64 years of age. Would at intervals scream or cry and become restless and combative.

Frequently the melancholic facial expression of despair, anxiety and pain is evinced by markedly reduced mimetic mobility.

The melancholic patient usually keeps his mouth open.

The psychoses of arteriosclerosis form another connecting link joining the period of involution and senility. Many involutional psychoses merge into arteriosclerotic degeneration, and arteriosclerosis is frequently combined with the changes incident to senility. The prodromal symptoms



Fig. 18—Cerebral arteriosclerosis. Male 79 years of age displaying nothing more than a gradual decay of mental functions. Has periods of confusion especially at night and is especially destructive of clothing. Is quite genial and cooperative as a rule.

(nervousness irritability headache dizziness and insomnia) merge gradually into symptoms of greater severity (Figs 14 15 16 17 18 19 20 and 21)

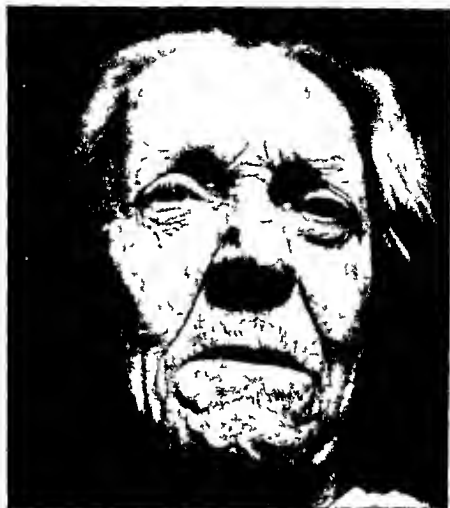


Fig. 19—Arteriosclerotic dementia.

It is often difficult to differentiate the melancholic and manic expression because of frequently occurring mixed types. However the periodically observed phases of manic and depressive forms of psychosis show marked contrast. In the manic phase cutaneous wrinkles are constantly present from the effects of melancholia. The forehead in the melancholic phase above the external part of the eyebrow shows a deeply engraved semicircular wrinkle.



Fig. 20—Arteriosclerotic senile dementia.

The facial expression in *mania* is signified by lively mobility. The dilated pupil changes quickly, the eyes have a wild glare. The movements of the eyelids also change quickly. Frequently the eyes are wide open. The facial skin often is reddish. In advanced cases it is evident that the patient



Fig. 21.—Senile deterioration.

has lost control over the mimetic play of the muscles. Some patients distort their faces constantly in grimaces. Sometimes the palpebral fissure is reduced because of contraction of the circular muscle of the eye and at the same time the upper lip is drawn up because of contraction of the circular muscle at the malar bone. The large muscles of the malar bone distort the mouth in a broad smile, drawing the angles of the mouth backward and upward, uncovering the upper row of teeth. The mania is however not restricted to gay expressions or grimaces, but it may also be



Fig 22—Maniac outburst Destructive mood

accompanied by expressions of extreme anger with exaggerated mimetic movements (Fig 22)

At the height of the mania crying and laughing change in quick succession or a gay smile alternates with violent attacks of anger. Sisorsky



Fig. 23—Cachexia in a man 42 years of age with dement a paralytica

distinguishes in mania between the prevailing, mimetic play of the emotional excitement and grimaces which remind one of muscular twitchings in chorea.

The facial expression in hysteria shows a motor or sensory paralysis crossed or on the same side. On the paralyzed side the angle of the mouth is deeper and the nasolabial fold is flatter, however the affected side functions normally. The contracted angle of the mouth shows a deepened and more curved nasolabial fold. The angle of the mouth shows small radiating folds. Fibrillary tremor often occurs during voluntary movements.



Fig. 24—Dementia paralytica. Man aged 50 who previously had grandiose and expansive ideas. Insisted on taking poison out of his nose and destroyed the entire cartilaginous nasal septum.

Besides hysterical paralysis in the region of the facial nerve we frequently find contractions and spasms appearing on the opposite side

During a protracted disease the symptom complexes may change considerably. Spasms may encroach upon neighboring groups of facial muscles. *Tonic blepharospasm* is almost always combined with a contraction of bulbar muscles or with a glossolabial hemispasm.

Crying and smiling spasms represent a compulsorily affective movement of expression. During true hysterical attacks the face in some phases is rigid and expressionless. At other times the expressions of anger, terror, and fear prevail. Facial pallidity may sometimes be seen during the hypnotic state; this is frequent in hysterical individuals (Figs. 23 and 24) and may increase to a point where the facial expression is masklike.

The facial expression in infectious diseases and intoxications does not represent any typical peculiarities. In infections the cerebral function may be disturbed by a variety of influences which give rise to manifold pictures in individual cases. Among the diseases of the cranial contents syphilis plays an important rôle.

In chronic alcoholism the facial vessels are engorged. Reddening of the face is striking even in early cases. In advanced cases enlargement of the veins appears at the nose and the neighboring parts of the cheeks. The color of the face is bluish. Sometimes acne rosacea occurs. However, total abstainers may have telangiectasis, especially in advanced age. The general muscular tremor in alcoholism is expressed in the face as *labial tremor*. Sometimes fibrillary twittings appear in the regions innervated by the facial nerve.

Morphinism generally does not show mimetic disturbances; however, the pale color of the face and myosis are characteristic. In *cocainism* typical dilatation of the pupils is observed.

Curschmann described the face in acromegaly as follows. The nose is especially thickened and prolonged at its tip; the thickening of the upper eyelids which hang down pouchlike with the consecutive narrowing of the palpebral fissure; the wide, puffed-up lips; the strongly prolonged and broadened chin; and the huge ears. The mandible particularly appears considerably enlarged because of increase in length, so that it exceeds the upper jaw in size by several centimeters (alveolar prognathism). The lower lip accordingly appears enlarged and prominently arched, and the entire oral aperture appears enlarged. Besides the lower jaw, the nasal and zygomatic bones also hypertrophy and often protrude from the face. The orbital edges become prominent, which makes the eyeballs appear recessed.

In *myxedema of adults* (often also in *mongolism*) we find a peculiar coloring of the skin, sometimes a reddening limited to the center of the cheek, which has the effect of "make-up" spots. The stupid facial expres-



Fig. 25—Mongolian idiot.

sion of myxedematous patients might be traced to the immobility of the mimetic musculature. Sometimes the forehead shows increased wrinkling and elevated eyebrows. While the shape of the face in acromegaly is longitudinal, it is more rounded in myxedema.

Cretinism in regard to the facial structure is described by Kraepelin as follows: "The head is, as a rule, comparatively large but flat, and mainly short; the face is low and broad, the neck short and thick. The base of the

skull is stunted however a bilateral enlargement of the cranial bones takes place which sometimes extends upward. The large fontanelle often remains open for a long time the symphyses of the base of the skull are preserved regularly in old age (Weygandt). Virchow believed that their premature ossification could be traced in many cases of cretinism. The skull frequently is thickened and the zygomatic arch and lower jaw weakly developed. The spongy expressionless faces with the puffed up cheeks and eyelids the thick lips the snub nose deeply depressed at the root present a very peculiar aspect. An admixture of childishness and senility is seen in extreme cases in which all personal and racial peculiarities are obliterated. The two rows of teeth often do not meet because the lower jaw recedes from the upper or it may protrude. The tongue is thick clumsy in its movements and often lies between the teeth. Throughout life the characteristics of myxedema are preserved in the shape of a fully rounded face with protruding puffed up lips puffy lids deep-lying eyes and dirty grey skin color. The cretinic features are especially distinct in hushing.

Exophthalmic goiter may appear without mental disturbances. The typical facial expression is described by Birschm as follows. As a rule the protrusion of the eyes occurs bilaterally. It sometimes begins unilaterally persisting for a long or short period but occurs unilaterally only in rare cases. The exophthalmos may be of such high degree that the insertion of the ocular muscles is visible the movement of the eyeball appears limited and the lids cannot be closed.

Though the following symptoms cannot necessarily be evaluated from a diagnostic point of view they are frequently observed in exophthalmic goiter: widening of the palpebral fissures of the eyelid and rarity of the lid pulsation (*Stellwag's sign*) lagging or jerklke movements of the upper eyelid in lowering of the visual line (*von Graefe's sign*) inability to fix objects at close range (*Moebius sign*).

In *paranoia* as in *melancholia* the superciliary corrugators are contracted most strongly however the transverse wrinkles of the forehead are absent in paranoid patients who show only vertical furrowing about the root of the nose. The orbicularis of the eyelids plays a lesser role in the paranoid than in the melancholic patient. The facial expression is as changeable as the clinical aspect. Transitions of melancholia occur and leave their traces in the face. The melancholic phase may leave furrowing of the forehead while the lower part of the face displays no traces of the mental condition. Sometimes however but not always a fatuous expression of the eyes is noticeable as in concentrated thinking. Pupillary differences are relatively frequent. Sometimes twitchings of the muscles of the



Fig 26—Delusion of grandeur. Note proud position of head. Patient believes herself to be Catherine the Great.

mouth may be observed. Frequently pathologic images are temporarily engraved on the face giving rise to expressions of pride, self-confidence, sulkiness, or bad temper. Distorted physiognomic expressions become



Fig. 27—Aural hallucinations. Patient hears voices from heaven. Note intense expression of face and eyes.

augmented where congenital anomalies are superadded to already existing facial and cranial malformations. Cases of hallucinatory disturbances equally depend upon concomitant imaginary pictures (Figs. 26 and 27).

Catatonic and demented individuals often show facial expressions approaching dissolution as the psychoses progress. *Catatonic dementia praecox*, like *hebephrenia*, may come on suddenly with symptoms of confusion or depression. It is characterized by a predominance of motile



Fig 28—Dementia praecox catatonica type

disturbances and tends to express itself in alternating conditions of *catatonic stupor* and *catatonic excitement*. In catatonic stupor negativism reaches a very high degree. The patients remain perfectly immobile in a given position for hours. They often refuse to speak.



Fig. 29.—Patient about 51 (?) with catatonic dementia praecox. Generally mute negativistic. Occasionally mumbles unintelligibly. On entrance two years ago was acutely disturbed combative and resistive talked incessantly and incoherently and was probably in a state of catatonic excitement despite the alcoholic history.

In the opposite type catatonic excitement there is a marked degree of activity constant talkativeness with destructive and impulsive tendencies at times. Death occasionally results during a high degree of excitement.

Turner occupied himself thoroughly with the problem of *dissolution of facial expressions*. The corresponding facial muscles do not contract in a harmonious or coordinating manner. If the patients lose more and

more control over the facial muscles the expression dissolves progressively. A forced muscular contraction is added. Turner points out that under these conditions the lower facial half participates while in normal persons only the upper half is involved. This results in an animal expression (Figs 28 29 30 31 and 32)



Fig 30—Catatonia. Patient will retain enforced postures for long periods of time

Oppenheim states that often only particular expressions are noted e g, the permanent expression of astonishment conditioned by staring eyes lifting of the eyebrows and opening of the mouth in idiots. In other patients with an immobile smooth forehead Oppenheim observed backward and forward motions of the eyes with simultaneous immovable eye lids recalling the immobile eyes of wax figures. In other cases of idiocy Oppenheim observed a striking contrast between the lively movements of the upper half of the face and the immobile lower facial hemisphere. Bleuler described the facial situation as follows. There is a lack of unity in the mimetic expression the furrowed forehead for instance expresses



Fig. 31.—Patient aged 57 years. Catatonic dementia praecox of about three years standing. He is altogether mute and while inclined to be negativistic, does not attitude.



Fig. 32.—Mute catatonic patient 49 years of age. Catatonia for 22 years. Had auditory and visual hallucinations. At the onset of his psychosis the patient had the feeling that his thoughts were being taken away from him. Note facial expression of distress in attempt to prevent thoughts being taken away.



Fig. 33—*Dementia praecox* hebephrenic type

something like astonishment the wrinkled eyes may give the impression of smiling while at the same time the corners of the mouth are depressed as in a sad expression. Frequently the expression is extremely exaggerated pathetic and theatrical.

The play of the facial muscles in idiocy and *congenital imbecility* and differences in physiognomy are manifold and changing and may be extremely complicated.

A variety of forms of facial expression may be noted in various stages of *paralysis*. Fibrillary facial twitchings affect all the facial muscles. Generally this disturbance of motion does not represent a complete paralysis but may be explained by the affection of individual muscle groups. Photographs of such expressions are difficult to obtain.

The expression of pain may be augmented to the highest degree of distortion in paralytic patients caused by spasmodic dysfunction of the muscles.

The reaction of the pupils is very characteristic in paralysis. Pinpoint pupils are of diagnostic and prognostic importance. Often the indolent and rigid pupillary reflex is preceded by a loss of the round shape of the edge of the iris.

In *dementia simplex* the onset is insidious the patient is emotionally somewhat depressed or lacking in initiative. Diagnosis of nervous breakdown or neurasthenia is often made. Many women in this group marry bear children and although looked upon as queer they get along unless subjected to serious economic strain.

Hebephrenia has a more acute onset than *dementia simplex* and although much the same is more severe. The general conduct of the patient may be listless apathetic and disinterested mild alternation of depression and of excitement with the development of peculiarities of conduct and speech show an alliance between this group and the catatonic. The patients may be outwardly of natural appearance being able to give a very good account of themselves but presenting a grotesque delusional system in marked contrast to the outward appearances. The delusions are loosely organized and interrupted by violent outbreaks restlessness and irritability (Figs 33 34 and 35).

In the chronic forms of the disease well defined mannerisms may develop. These patients show a characteristic stiffness awkwardness clumsiness they are inaccessible and seemingly indifferent to their surroundings they are given at times to emotional outbursts without apparent cause (Fig 36).



FIG. 34—Dementia praecox, hebephrenic type.



Fig. 35.—Hebephrenic dementia praecox. Man 51 years of age whose mental abnormality was discovered 25 years ago after he was sentenced for robbery. Is apathetic, smiles and grins inappropriately.



Fig. 36—Chronic manic

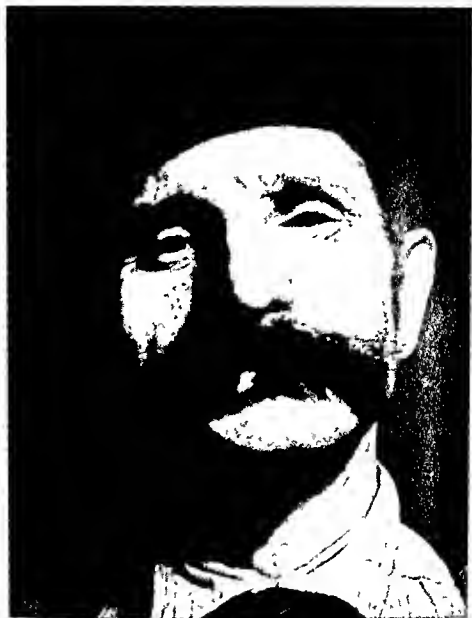


Fig. 37—Dementia praecox, seven years' duration. Paranoid ideas against families at the onset of the psychosis. Patient is extremely polite and decorous. Bows low in a stately manner when addressed and has bearing of a continental boulevardier.



Fig. 38—Dementia praecox. Patient 74 years of age. In institution over 40 years. Note distrustful face. Patient is active, garrulous, good natured and agreeable. He shows little sign of deterioration but is without insight. Is inclined to ramble at great length upon religious topics, criticizes the Bible for its licentious stories, believes only in the Golden Rule. He propounds the following questions: "Do people pray to a blood-thirsty God?" "Can a harlot be trusted?" Uses an ingenious system of reminders consisting of brief notations written on newspaper clippings which are changed daily and pinned to his vest. One side of his vest is devoted to "Business" and the other side to "Pleasure" items. He treasures a much worn volume entitled "Love Letters of a Worldly Woman." Many underscored passages are discussed with gusto. Note particularly the condition of the occipito-frontalis, facial, labial and mental muscles.



Fig. 39—Manic-depressive, manic type.



Fig. 40—Maniac (deterioration). Patient 48 years of age. Had three major psychotic breakdowns in the last 11 years. Shows no tendency to recover from his most recent attack of almost two years' standing. Displays marked increase in psychotic activity. Is very restless, talkative and destructive. His mood is generally one of exuberance and elation. His flight of ideas is such as to make his words and phrases jumbled.



Fig 41—Same patient as in Fig 40 after metrazol shock treatment.



Fig. 42—Same patient as in Fig. 41 following metrazol shock treatment.



Fig. 43—Same patient as in Fig. 42 following metrazol shock treatment

In the *paranoid* form, there are delusions and associated hallucinations. There is much less outward evidence of deterioration and emotional indifference. Thus one may observe cases with delusions of grandeur (Fig. 37) or with delusions of persecutions (Fig. 38).

The depressive phase of the disease manifests itself by three cardinal symptoms, namely difficulty of thinking, psychomotor retardation and emotional depression. These patients move and speak slowly, answering questions in monosyllables. These symptoms are more marked in acute melancholia.

Meitrozol treatment in schizophrenia has been used to advantage in certain cases. Figs. 40, 41, 42 and 43 depict a patient forty-eight years of age who had three major psychotic breakdowns in the last eleven years. He showed no tendency to recover from his most recent attack of almost two years' standing and displayed marked increase in psychotic activity. His mood is generally one of exuberance and elation. He is very restless, talkative and destructive. His flight of ideas is such as to make his words and phrases jumbled.

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